FACULTY OF SCIENCES

SYLLABUS

FOR

THE BATCH FROM THE YEAR 2022 TO YEAR 2025

(Semester I- II)

Examinations: 2022-2025

PG DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS

KHALSA COLLEGE, AMRITSAR

INDEX

SYLLABUS FOR THE BATCH FROM THE YEAR 2022 TO YEAR 2024

Programme Code: MCS

Programme Name: M.Sc. (Computer Science)

(Semester I-IV)

Examinations: 2022-2024

P.G. Department of Computer Science & Applications

Khalsa College, Amritsar

Programme name: M.Sc. (Computer Science)
Programme code: MCS
Programme Duration :2 years

Programme Objectives

1.	To impart sound knowledge in Computer Science and to enable students to apply the acquired skills creatively in computer and related technologies in practical scenarios.
2.	To effectively utilize knowledge of computing and mathematical principles to develop sustainable solutions to the present and the prospective computing problems.
3.	To effectively initiate, create and to communicate innovation through social, legal, ethical, and cultural issues inherent in the discipline of computing concepts and solutions to bridge the gap between computing industry experts and business leaders.
4.	To exhibit computing expertise through corporate leadership and entrepreneurship;
5.	To address in the broad areas of multi-disciplinary in nature, and to keep pace with advances in computing technology

Programme Specific Outcomes (PSOs):

PSO-1.	Students gain knowledge in the areas like Soft Computing, Web Services, Cloud Computing, Paradigm of Programming language, Design and Analysis of Algorithms, Database Technologies, Advanced Operating System, Image Processing, Software Project Management and core computing subjects.
PSO-2.	Students understand all dimensions of the concepts of software application and projects.
PSO-3.	Students become employable according to current demand of IT Industry.
PSO-4.	Work in a collaborative manner with others in a team, contributing to the management, planning and implementation of a computer system.

M.Sc. (Computer Science)
Semester I

Sr. No.	Course Code	Course Name	Marks				Page No.
			Theory	Internal Assessment	Practical	Total	
1	MCS-411	Advance Data Structure	**75**	**25**	**-**	**100**	**6-7**
2	MCS-412	Advanced Computer Architecture	**75**	**25**	**-**	**100**	**8-9**
3	MCS-413	Network Design and Performance Analysis	**75**	**25**	**-**	**100**	**10-11**
4	MCS-414	Discrete Structures	**75**	**25**	**-**	**100**	**12-13**
5	MCS-415	Soft Computing	**75**	**25**	**-**	**100**	**14-15**
6	MCS-416P	Programming Laboratory-I(Based on Advanced Data Structures)	**-**	**25**	**75**	**100**	**16**
					Total Marks	**600**	

M.Sc. (Computer Science)
SEMESTER-I

MCS-411: Advanced Data Structures

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (Per Week):4 **Theory Marks: 75**
Total Hours: 60 **Theory Internal Assessment M: 25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

Course Objectives:

1.	To provide the foundations of the practical implementation and usage of Algorithms and Data Structures.
2.	To ensure that the student evolves into a competent programmer capable of designing and analyzing implementations of algorithms and data structures for different kinds of problems.
3.	To expose the student to the algorithm analysis techniques, to the theory of reductions.

UNIT-I

Review of algorithm analysis, Binary search trees, balanced binary search trees (red-black trees), Btrees, AVL Trees, 2-3 trees, 2-3-4 trees.
Binary heaps, heap operations, specifications, implementation and applications. Advanced heap structures, priority queue operations, and double-ended priority queues.
Dictionaries, binomial heaps, Fibonacci heaps. Data structures for disjoint sets, tables and table operations.

UNIT-II

Strings: Introduction, Operations, Memory representation, Pattern matching algorithms-Brute force, the Boyer –Moore algorithm, the Knuth-Morris-Pratt algorithm.

Amortized analysis, Graph algorithms: DFS, BFS, Shortest path algorithm, Spanning tree, Biconnected components.

External data structures - external storage, external files, external sorting searching indexing files, external hashing.

References:

1. Alfred V. Aho, Jeffrey D. Uuman, John E. Hopcroft, "Data Structures and Algorithms" Addision Wesley, 1983.
2. Dinesh P. Mehta, I. SartajSahni, "Handbook of Data Structures and Applications", Chapman & Hall/CRC, 2004.
3. Sorenson and Trembley, "An Introduction to Data Structures with Applications, McGraw Hill,\2006 Edition.

Course Outcomes:

On Completing the course, the students will be able to:

1.	Design and analyze programming problem statements.
2.	Choose appropriate data structures and algorithms, understand the ADT/libraries, and use it to design algorithms for a specific problem.
3.	Understand the necessary mathematical abstraction to solve problems.
4.	Come up with analysis of efficiency and proofs of correctness
5.	Comprehend and select algorithm design approaches in a problem specific manner.

M.Sc. (Computer Science)
SEMESTER-I

MCS-412: Advanced Computer Architecture

Time: 3 Hrs. **Theory Marks: 75**
Credit Hourse (Per Week): 4 **Total Marks: 100**
Total Hours: 60 **Theory Internal Assessment M: 25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

Course Objectives:

1.	To make students know about the Parallelism concepts in Uniprocessor systems.
2.	To give the students an elaborate idea about the different memory systems and buses.
3.	To introduce the advanced processor architectures to the students.
4.	To make the students know about the importance of multiprocessor and pipeline computers.
5.	To study about data flow computer architectures.

UNIT -I

Paradigms of Computing: Synchronous – Vector/Array, SIMD, Systolic
Asynchronous – MIMD, reduction Paradigm, Hardware taxanomy: Flynn's classification, Software Taxanomy: Kung's taxanomy, SPMD.
Parallel Computing Models: Combinational Circuits, Sorting Networks, PRAM models, Interconnection RAMs.
Parallelism in Uniprocessor Systems: Trends in parallel processing, Basic Uniprocessor Architecture, Parallel Processing Mechanism.

UNIT -II

Parallel Computer Structures: Pipeline Computers, Array Computers, Multiprocessor Systems

Architectural Classification Schemes: Multiplicity of Instruction-Data Streams, Serial versus Parallel Processing, Parallelism versus Pipelining

Pipelining: An overlapped Parallelism, Principles of Linear Pipelining, Classification of Pipeline Processors, General Pipelines and Reservation Tables

References:

1. Computer Architecture and Parallel Processing, Faye A. Briggs, McGraw-Hill International, 2007 Edition
2. Computer Systems Organization & Architecture, John d. Carpinelli, Addison Wesley, 2007 Edition.

Course Outcomes: **On Completing the course, the students will be able to:**	
CO-1.	Demonstrate concepts of parallelism in hardware/software.
CO-2.	Understanding the parallel computing models.
CO-3.	Describe architectural features of advanced processors.
CO-4.	Interpret performance of different pipelined processors.
CO-5.	Understanding the parallel processing mechanism in uniprocessor systems.
CO-6.	Become familiar with the concept of pipeline, array and multiprocessor systems.

M.Sc. (Computer Science)
SEMESTER-I

MCS-413: Network Design & Performance Analysis

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (Per Week):4 **Theory Marks: 75**
Total Hours: 60 **Theory Internal Assessment M: 25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

Course Objectives:

1.	Understand that global connectivity can be achieved through computer networks.
2.	Understand the function of networks and get exposure to different existing and upcoming communication technologies.
3.	Make them aware that knowledge about hardware and software requirements of networks is essential.
4.	Understanding the requirements, planning and choosing the technology for building a network.
5.	Providing the knowledge about network design, security, documentation and managing the network.

UNIT -I

Requirements, planning, & choosing technology: System requirements, traffic sizing characteristics time & delay consideration. Traffic engineering and capacity planning: Throughput calculation traffic characteristics &source models, traditional traffic engineering, queued data & packet switched traffic modelling, designing for peaks, delay or latency Network performance modelling- Creating traffic matrix, design tools, components of design tools, types of design projects. Technology Comparisons-

Generic packet switching networks characteristics, private vs. public networking, Business aspects of packet, frame and cell switching services, High speed LAN protocols comparison, Application performance needs, Throughput, burstiness, response time and delay tolerance, selecting service provider, vendor, service levels etc.

UNIT -II

Access Network Design- N/W design layers, Access N/W design, access n/w capacity, Backbone n/w design, Backbone segments, backbone capacity, topologies, Tuning the network, securing the network, Design for network security. Documentation and network management- Documentation, network management, SNMP, RMON. Network Optimization- Network optimization theory: Goals of network optimization, measurements for network optimization, optimization tools, optimization techniques.

References:

1. James D. McCabe, Network Analysis, Architecture and Design, 2nd Edition, Morgan Kaufman Series in Networking, 2007 Edition.
2. YoueuZheng, Shakil Akhtar, Network for Computer Scientists and Engineers, Indian University, Oxford University Press, 2007 Edition.
3. Forouzan, Data Communications and Networking, Tata McGraw Hill, 2007 Edition.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Familiar with the concept of Network hardware and software requirements.
CO-2.	Understand the different protocols working at different layers of OSI and TCP/IP models.
CO-3.	Learn the concepts of different networking devices like router, hub, and switch.
CO-4.	Understanding the concept of traffic engineering and capacity planning.
CO-5.	Learn the concepts of switching and network performance modeling.
CO-6.	Comparing the private and the public networking.
CO-7.	Understanding the network design and network management.
CO-8.	Learning the concept of Network optimization.

M.Sc. (Computer Science)
SEMESTER-I

MCS-414: Discrete Structures

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (Per Week):4 **Theory Marks: 75**
Total Hours: 60 **Theory Internal Assessment M: 25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

Course Objectives:

1.	To construct correct direct and indirect proofs.
2.	Apply logical reasoning to solve a variety of Problems.
3.	To use Graph Theory to solve the Problems
4.	To formulate problems and solve recurrence relations.

UNIT -I

Graph Theory: Graph - Directed and undirected Eulerian chains and cycles. Hamiltonian chains and cycles Trees, Chromatic number Connectivity and other graphical parameter. Application.
Combinatorial Mathematics: Basic counting principles Permutations and combinations Inclusion and Exclusion Principle Recurrence relations, generating Function, Application.
Sets and Functions : Sets relations functions operations equivalence relations, relation of partial order partitions binary relations.

UNIT -II

Monoids and Groups: Groups Semigroups and monoids Cyclic semi graphs and sub monoids, Subgroups and Cosets. Congruence relations in semigroups. Morphisms.
Normal subgroups. Structure of Cyclic groups permutation groups, dihedral groups Elementary applications in coding theory.
Rings and Boolean algebra: Rings Subrings morphism of rings ideals and quotient rings. Euclidean domains Integral domains and fields Boolean Algebra direct product morphisms

Boolean sub-algebra Boolean Rings Application of Boolean algebra in logic circuits and switching functions.

References:

1. Ehrig, H., Mahr, B. Fundamentals of Algebraic Specification I, EATCS Monographs onTheory. Comp. Sc. Vol. 6 spinger, Berlin 1985.
2. Gersting J. Mathematical Structures for Computer Science, W.H. Freeman, New York,1987.
3. Gibbons, A. Algorithmic Graph theory Cambridge University Press, 1985.
4. Knuth, D.E. The art of Computer Programming Vol. I: Fundamental Algorithms. 2nd ed.Reading, Mass, Addison Wesley 1973.
5. Kolman B. Busby R. Discrete Mathematical Structures for Computer Science, Prentice HallEnglewood Cliffs. 1987.
6. Sahni, S. Concepts in Discrete Mathematics Fridley MN., Camelot Publ. Comp., 1981.
7. Schmidt G. Strohlein T. Relations Graphs Program, EATS Monograph on Theor. Comp. Sc. Vol. 29 Berlin Spinger 1993.
8. Wheeler W. Universal Algebra for Computer Scientist EATCS Monographs on Theor.Comp. Sc. Vol. 25
   Spinger-Verlag, Berlin 1991.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Identify sets, different properties of sets, set operations and set identities
CO-2.	Explain the different methods for representing the relationship between sets.
CO-3.	Learn the basic concepts involving functions needed in discrete structures.
CO-4.	Define and interpret the concepts of divisibility, congruence etc.

M.Sc. (Computer Science)
SEMESTER-I
MCS-415: Soft Computing

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (per week):4 **Theory Marks: 75**
Total Hours: 60 **Theory Internal Assessment M: 25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

Course Objectives:

1.	Students are able to recognize the feasibility of applying a soft computing methodology for a particular problem.
2.	Understand appropriate learning rules for each of the architectures and learn several neural network paradigms and its applications
3.	Students reveal different applications of these models to solve the problems related to soft computing.

UNIT -I

Neural Networks

Introduction to neural networks, working of an artificial neuron, linear seperability, perceptron, perceptron training algorithm, back propagation algorithm, adalines and madalines.

Supervised and unsupervised learning, counter-propagation networks, adptive resonance theory, neocognitron and bidirectional associative memory.

Fuzzy Logic Introduction to fuzzy logic and fuzzy sets, fuzzy relations.

UNIT -II

Fuzzy graphs, fuzzy arithmetic and fuzzy if-then rules.

Applications of fuzzy logic, neuro-fuzzy systems and genetic algorithm.

Probabilistic Reasoning, Introduction to probability theory, conditional probability, Baye's theorem, random variables and expectations.

Probability distributions, various types of probability distributions like joint distributions, normal distributions etc., fuzzy logic and its relationship with probability theory.

References:

1. Elements of artificial neural networks by KishanMehrotra, Chilkuri K. Mohan and Sanjay Ranka, 2007 Edition.
2. Fundamentals of artificial neural networks by Mohammad H. Hassoun, Prentice Hall ofIndia, 2007 edition.
3. Neural networks and fuzzy systems by Bart Kosko, Prentice Hall of India, 2007 edition.
4. Fuzzy logic, intelligence, control and information by John Yen and Reza Langari, Pearson Education, 2007 edition.
5. Probability and statistics by Murray R. Spiegel, John Schiller and R. AluSrinivasan,Schaum's Outlines, Tata McGraw Hill Publishing Company Limited, 2007 edition.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Explain soft computing concepts like fuzzy logic, neural networks, genetic Algorithms & Probability.
CO-2.	Know about fuzzy systems, fuzzy logic and its applications.
CO-3.	Get introduce students to artificial neural networks and fuzzy theory.
CO-4.	Learn the concepts of Probabilistic Reasoning.
CO-5.	Get knowledge related to Probability Distribution.

M.Sc. (Computer Science)
SEMESTER-I

MCS-416 P
Programming Laboratory – I
(Based on Advanced Data Structures)

Time: 3 Hrs **Total Marks: 100**
Credit Hours (Per Week):4 **Practical Marks: 75**
Practical Internal Assessment M: 25

Course Objectives:

1.	Understand and apply linear data structures-List, Stack and Queue.
2.	Understand the graph algorithms.
3.	Learn different algorithms analysis techniques.
4.	Apply data structures and algorithms in real time applications
5.	Able to analyze the efficiency of algorithm

Programs based on Advanced Data Structures using C/C++

Course Outcomes (COs):

On Completing the course, the students will be able to:

CO-1.	Formulate, design and analyse algorithms for problem statements.
CO-2.	Implement basic data structures and sorting algorithms.
CO-3.	Choose appropriate data structures and algorithms, understand the ADT/libraries, and use it to design algorithms for a specific problem.
CO-4.	Design and develop efficient algorithms for problem.
CO-5.	Implement algorithm using tree and graph structures.

M.Sc. (Computer Science)
Semester II

Sr. No.	Course Code	Course Name	Marks				Page No.
			Theory	Internal Assessment	Practical	Total	
1	MCS-421	Theory of Computation	75	25	-	100	18-19
2	MCS-422	Image Processing	75	25	-	100	20-21
3	MCS-423	Design and Analysis of Algorithms	75	25	-	100	22-23
4	MCS-424	Cloud Computing	75	25	-	100	24-25
5	MCS-425	Distributed Database System	75	25	-	100	26-27
6	MCS-426P	Programming Laboratory-II	-	25	75	100	28
					Total Marks	**600**	

M.Sc. (Computer Science)
SEMESTER-II

MCS-421: Theory of Computation

Time: 3 Hrs
Credit Hours (per week):4 **Total Marks: 100**
Total Hours: 60 **Theory Marks: 75**
Theory Internal Assessment M: 25

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Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

Course Objectives:

1.	To make students understand the basic mathematical model of computation
2.	To understand the relation between these formal languages, grammars, and machines.
3.	To understand the complexity or difficulty level of problems when solved using these machines.
4.	To compare the complexity of problems.

UNIT –I

Finite Automata Deterministic Finite Automata, non deterministic finite Automata, Transition System, Equivalence of NFA and DFA, Finite Automata with Null-moves. 2-Way Finite Automata, crossing sequences, Moore and Mealy Machine, Inter Conversion of Moore and Mealy Machine, Application of finite automata i.e. Lexical Analyzers, text editors. Minimization of finite Automata, construction of minimum automation, Formal languages,
Chomsky Hierarchy of Languages, Recursive and recursively-enumerable languages sets, Language and their relation, Languages and automata.

Regular Expression and Languages: Regular expression, Equivalence of finite Automata and Regular expressions, Conversion between regular expressions and finite automata, Application of Regular Expressions.

Regular Languages and Regular sets, Pumping lemma for regular sets, Applications of pumping lemma. Closure properties of regular language.

UNIT –II

Context free Grammar and Languages: Context free Grammars, Derivation Trees, Leftmost and rightmost derivations, Ambiguity, Properties of Context free Languages- Normal forms for context free grammars (Chomsky Normal Form, Griebach Normal Form, The Kuroda Normal Form)

Pushdown Automata: Deterministic Push down Automata; Equivalence of Push Down Automata and Context free grammar. Linear Bounded Automata (LBA): Power of LBA, Closure Properties.

Turing Machine (TM): One Tape, multi tape, the notions of time and space complexity in terms of T.M. Construction of simple problems. Computational complexity.

References:

1. J.E. Hopcroft, R. Motwani and J.D. Ullamn, “Introduction to Automata Theory, Languages and Computation”, Pearson Education Asia, 2nd Edition.
2. John C. Martin, “Introduction to Languages and the Theory of Computation”, Tata McGraw Hill Publication Company Limited, 3rd Edition.
3. K.L.P Mishra and N. Chandrasekaran,” Theory of Computer Science”,Prenctice-Hall of IndiaPvt.Ltd. 3rd Edition”
4. Daniel I.A. Cohen, "Introduction to Computer Theory", Wiley, Second edition.
5. B. M. Moret, “The Theory of Computation”, Pearson Education Asia.
6. H.R. Lewis and C.H. Papa dimitriou, “Elements of the theory of Computation”, Pearson Education Asia 2nd Edition.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Learn about deterministic and non-deterministic finite state machines along with their designing, conversion from finite machines to regular grammar, conversion from regular grammar to finite automata, and their applications.
CO-2.	Comprehend the working and applications of pumping lemma.
CO-3.	Gain insight into the concept of Context free grammar and normal forms of context free grammar.
CO-4.	Design the pushdown automata.
CO-5.	Design the Turing Machines and will get knowledge about the notions of time and space complexity in terms of Turing Machine.

M.Sc. (Computer Science)
SEMESTER-II

MCS-422: **Image Processing**

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (Per Week): 4 **Theory Marks: 75**
Total Hours: 60 **Theory Internal Assessment M: 25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

Course Objectives:

The objective of this course is to:

1.	Learn the Fundamental concepts of a digital image processing system.
2.	Understanding of image enhancement and Image restoration techniques
3.	Study Compression techniques and morphological concepts.
4.	Learn Colour models and various applications of image processing

UNIT -I

Background: Introduction to electronic systems for image transmission and storage, computer processing and recognition of pictorial data, overview of practical applications.
Fundamentals: Mathematical and perceptual preliminaries, human visual system model, imagesignal representation, imaging system specification building image quality, role of computers,image data formats.
Image Processing Techniques: Image enhancement, image restoration, image feature extraction,image data compression and statistical pattern recognition.

Unit -II

Hardware architecture for image processing: Distributed processing of image data, role of arrayprocessing, standard image processor chips (as example).

Techniques of Colour Image Processing: Colour image signal representation, colour systemtransformations, extension of processing techniques to colour domain.
Applications of Image Processing: Picture data archival, machine vision, medical imageprocessing.

References:

1. Pratt, W.K. Digital Image Processing, John Wiley, N.Y./1978.
2. Rosenfield, A and Kak, A.C., Picture processing, Academic PressN.Y., 1982.
3. Jain, A.K., Fundamentals of Digital Image Processing, Englewood Cliffs, Prentice Hall,1989.
4. Chris Soloman, Stuart Gibson, Fundamentals of Digital Image Processing: A PracticalApproach using MatLab, John Wiley and Sons, 2007.
5. Digital Image Processing by Gonzalez & Wood, Addison Wesley, 2000.
6. Solomon Chris , Toby Breckon Fundamentals of Digital Image Processing :A Practical Approach with Examples in Matlab.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Study the fundamental concepts of image processing
CO-2.	Learn about different image enhancement techniques
CO-3.	Analyze the basic algorithms used for image processing and image compression.
CO-4.	Study the practical applications of image processing
CO-5.	Contrast image segmentation and representation

M.Sc. (Computer Science)
SEMESTER-II

MCS-423: Design & Analysis of Algorithms

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (per week):4 **Theory Marks: 75**
Total Hours:60 **Theory Internal Assessment M: 25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

Course Objectives:

1.	This course aims to introduce the classic algorithms in various domains, and techniques for designing efficient algorithms.
2.	Algorithm design and analysis provide the theoretical backbone of computer science and are a must in the daily work of the successful programmer.
3.	The goal of this course is to provide a solid background in the design and analysis of the major classes of algorithms. At the end of the course students will be able to develop their own versions for a given computational task and to compare and contrast their performance.

UNIT -I

Introduction: Concept of Algorithm, Algorithm Specification, Performance Analysis (Time and space complexities), Asymptotic Notations.
Divide and Conquer: General Method, Binary Search, Finding the Maximum andMinimum, Quick Sort, Selection.
Greedy Method: General Method, Knapsack Problem, Minimum Cost Spanning Trees (Prim's Algorithm, Kruskal's Algorithm) and Sibnngle-Source Shortest Path.

Dynamic Programming: General Single Method, Multistage Graphs, All Pairs ShortestPaths, Single-Source Shortest Paths, Optimal Binary Search Tress, 0/1 Knapsack andTravelling Saleman Problem.

UNIT –II

Backtracking: General Method, 8-Queens Problem, Graph Coloring and HamiltonianCycles.
Search and Traversal Technique: Techniques for Binary Trees, Techniques for Graphs.
Algebraic Algorithms: General Method, Evaluation and Interpolation, Fast FourierTransformation, Modular Arithmatic.
NP- Hard Problems: Basic Concepts, Nondeterministic Algorithms, Classes *NP*-Hard and *NP*-Complete, *NP*-Hard Graph Problems (CNDP, DHC, TSP and AOG).

References:

1. V. Aho, J.E. Hopcroft, J.D. Ullman, Design and Analysis of Algorithms, AddisonWesley, 1976.
2. Horowitz, S. Sahni, Fundamentals of Computer Algorithms, Galgotia Publishers,1984.
3. K. Mehlhorn, Data Structures and Algorithms, Vols. 1 and 2, Springer Verlag, 1984.
4. Purdom, Jr. and C. A. Brown, The Analysis of Algorithms, Holt Rinechart andWinston, 1985.
5. D. E. Kunth, The Art of Computer Programming, Vols. I and 3, Addison Wesley,1975.
6. AnanyLevitin, Introduction to the Design & Analysis of Algorithms, Addison,Wesley, 2002.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Analyze the asymptotic performance of algorithms.
CO-2.	Write rigorous correctness proofs for algorithms.
CO-3.	Demonstrate a familiarity with major algorithms and data structures.
CO-4.	Apply important algorithmic design paradigms and methods of analysis.
CO-5.	Synthesize efficient algorithms in common engineering design situations.

M.Sc. (Computer Science)
SEMESTER-II

MCS-424: Cloud Computing

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (Per Week): 4 **Theory Marks: 75**
Total Hours: 60 **\Theory Internal Assessment M: 25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

Course Objectives:

1.	Highlight the specific privacy and information security risks that can exists using cloud computing services.
2.	Explain the various open challenges and issues of cloud computing.
3.	Clarify what cloud computing is and what are the various advantages and limitations of using cloud computing.
4.	Enlighten the different services of cloud computing.
5.	Introduce the advance concepts such as Big Data Analytics, Federated Cloud Computing.

UNIT -I

Introduction: Definition, Vision, Reference Model, Benefits, Limitations, Terminology, Open Challenges.

Virtualization: Definition, Type of Virtualization, Benefits, Limitations, Virtualization and Cloud, Virtual Appliance.

Cloud Computing Architecture: Service Models, Deployment Models, Cloud Entities, Cloud Clients, Service Level Agreement (SLA) and Quality of Service (QoS) in Cloud Computing.

UNIT -II

Programming Models in Cloud: Thread Programming, Task Programming and Map–Reduce Programming.

Cloud Security: Infrastructure Security, Data Security, Identity and Access Management, Privacy Management, Security as a Service on Cloud.

Advance Topic in Cloud: Energy Efficiency in cloud, Market Oriented Cloud Computing, Big–Data Analytics, Federated Cloud Computing.

References:

1. Barrie Sosinsky, Cloud Computing Bible, Wiley India Pvt. Ltd., ISBN–13: 978–8–12–652980–3, New Delhi, India, 2011.
2. Dr.Saurabh Kumar, Cloud Computing: Insights Into New–Era Infrastructure, Wiley India Pvt. Ltd, ISBN–13: 978–8–12–652883–7, New Delhi, India, 2011.
3. Fern Halper, Hurwitz, Robin Bloor, Marcia Kaufman, Cloud Computing for Dummies, Wiley India Pvt. Ltd, ISBN–13: 978–0–47–059742–2, New Delhi, India, 2011.
4. RajkumarBuyya, Christian Vecchiola and ThamaraiSelvi, Mastering Cloud Computing: Foundation and Application Programming, Tata McGraw Hill, ISBN–13: 978–1–25–902995–0, New Delhi, India, Feb 2013.
5. Tim Mather, SubraKumaraswamy, ShahedLatif, Cloud Security and Privacy, O'Reilly, ISBN–13: 978–8–18–404815–5.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Know the impact of engineering on legal and societal issues involved in addressing the security issues of cloud computing.
CO-2.	Apply and design suitable Virtualization concept, Cloud Resource Management and design scheduling algorithms.
CO-3.	Create combinatorial auctions for cloud resources and design scheduling algorithms for computing clouds.
CO-4.	Design different work flows according to requirements and apply map reduce programming model.
CO-5.	Address cloud Storage systems and Cloud security, the risks involved, its impact and develop cloud application.
CO-6.	Analyze the Cloud computing setup with its vulnerabilities and applications using different architectures.

M.Sc. (Computer Science)
SEMESTER-II

MCS-425: Distributed Database Systems

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (per week):4 **Theory Marks: 75**
Total Hours: 60 **Theory Internal Assessment M: 25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

Course Objectives:

1.	Provides knowledge needed to understand distributed database management systems (DDBMs).
2.	Focus on data fragmentation and allocation, query optimization and transaction processing

UNIT -I

Introduction to distributed databases, comparison of distributed and centralized systems, DDBMS, global relations, fragment and physical image, types of schemas, methods of fragmentation of a relation, levels of transparency in a distributed system, integrity constraints.

Representation of database, operation in form of a query, operations on a query, unary and binary tree in a query, converting a global query into fragment query, join and union operations involving a query, aggregate functions, and parametric queries.

Introduction to query optimization, estimation of profiles of algebraic operations, optimization graphs, reduction of relation using semi-join and join operation.

UNIT -II

Properties and goals of transaction management, distributed transactions, recovery mechanism in case of transaction failures, log based recovery, check pointing, and communication and site failures in case of a transaction and methods to handle them, serializability and timestamp in distributed databases.

Introduction to distributed deadlocks, local and global wait for graphs, deadlock detection using centralized and hierarchical controllers, prevention of deadlocks, 2 and 3 phase locking and commitment protocols, reliability in commitment and locking protocols, reliability and concurrency control, reliability and removal of inconsistency.
Distributed database administration, authorization and protection in distributed databases, distributed database design, heterogeneous database system.

References:

1. Distributed Databases Principles and Systems by Stefano Ceri and Guiseppe Pelagatti, McGraw-Hill International Editions, 2004.
2. Distributed Database Systems by David Bell, JameGrimson, Addison-Wesley, 1992.
3. M.TamerOzsu, Patrick Valdureiz, 'Principles of Distributed Database Systems'Second Edition, Prentice Hall, 2002.
4. RomezElmasri, ShamkantB.Navathe, 'Fundamentals of Database Systems' PearsonEducation, 2005.
5. Silberschatz, Korth, Sudershan "Database System Concepts" 4th Ed. McGraw Hill,2006

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Learning the concepts of distributed database systems architecture and design.
CO-2.	Students will be able to differentiate between horizontal and vertical fragmentation.
CO-3.	Get knowledge of different database recovery, 2PC and 3PC protocols.
CO-4.	Apply methods and techniques for distributed query processing and optimization.
CO-5.	Understand the broad concepts and properties of transaction management.

M.Sc. (Computer Science)
SEMESTER-II

MCS-426P
Programming Laboratory – II

Time: 3 Hrs **Total Marks: 100**
Credit Hours (Per week):4 **Practical Marks: 75**
Total Hours: 60 **Practical Internal Assessment M: 25**

Course Objectives:

1.	To develop proficiency in problem solving and programming.
2.	To be able to carry out the Analysis of various Algorithms for mainly Time and Space Complexity.
3.	To develop a base for advanced study in Computer Science.

Implementations based on Design & Analysis of Algorithms or Distributed Database System or Cloud Computing or Image Processing

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Get a good understanding of applications of Data Structures
CO-2.	Understand problems by applying appropriate algorithms.
CO-3.	Apply techniques of stacks and queues to solve problems.
CO-4.	Analyse the efficiency of various algorithms.
CO-5.	Solve a program in many ways using different techniques.

M.Sc.(Computer Science)

Semester III

Sr. No.	Course Code	Course Name	Marks				Page No.
			Theory	Internal Assessment	Practical	Total	
1	MCS-531	Advanced Software Engineering	75	25	-	100	30-31
2	MCS-532	System Software	75	25	-	100	32-33
3	MCS-533	Data Mining and Warehousing	75	25	-	100	34-35
4	MCS-534	Concept of Core and Advanced Java	75	25	-	100	36-37
5	MCS-535	Network Programming	75	25	-	100	38-39
6	MCS-536P	Programming Laboratory-III (Based on Advanced Java and Network Programming)	-	25	75	100	40
					Total Marks	**600**	

M.Sc. (Computer Science)
SEMESTER-III

MCS-531: Advanced Software Engineering

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (Per Week):4 **Theory Marks: 75**
Total Hours:60 **Theory Internal Assessment M: 25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

Course Objectives:

1.	Understand Knowledge about advanced software engineering.
2.	Understand System development life cycle.
3.	Learn Software process methodologies.
4.	Understand the principles of object-oriented software construction.
5.	To Know about the software-development process, including requirements analysis, design, programming, testing and maintenance.
6.	Able to model object-oriented software systems.
7.	Understand how to design and plans of software solutions to problems using an object-oriented strategy.

UNIT-I

Software Project Management: Fundamentals of Software project planning, Conventional Software Management, Evolution of Software Economics, Improvement of Software Economics, Comparison of old and modern ways of Software Management.

Software Re-engineering: Introduction Re-engineering, Restructuring and Reverse Engineering, Re-engineering existing systems, Data Re-engineering and migration, Software Reuse and Reengineering.

UNIT-II

Object-Oriented (OO) Measurements: Introduction, Why metrics? Classification of OOmetrics, Study of Design Metrics- method size, method internals, class size, class inheritance, Method inheritance, class intervals and class externals.

Object-Oriented Analysis and Design: What is Object-Oriented Design?, Object, Abstraction, Collaboration among Objects, Polymorphism, Classes, specifying State, Specifying Behaviour, Class Relationships, Grouping, Hiding.

Software Agents: Definition, Applications, Types and Classes, Multi-Agent systems, characteristics & Properties of Agents.

References:

1. Software project management, Walker Royce, Pearson Education Inc.
2. Software Re-engineering, Robert S. Arnold IEEE Comp. Society.
3. Object Oriented Software Metrics, Lorenz and Kidd.
4. Object-Oriented Analysis and Design, Booch.

Course Outcomes:

At the end of this course the student shall be able to:

CO-1.	Acquire the knowledge of software-engineering.
CO-2.	Get knowledge of basic Software Engineering methods and practices.
CO-3.	Understand Software Engineering appropriate applications.
CO-4.	Understanding of different measurements of object oriented.
CO-5.	Understanding about software process models such as the water fall and evolutionary models.
CO-6.	Gain knowledge of UML for object-oriented design.
CO-7.	Identify some of the main risks of software development.

M.Sc. (Computer Science)
SEMESTER-III
MCS-532: System Software

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (per week):4 **Theory Marks: 75**
Total Hours:60 **Theory Internal Assessment M: 25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

Course objectives:

The objective of this course is to:

1.	Understand the components of system software and Familiarization with Assembly language.
2.	Detailed knowledge of Compilation process of a program.
3.	Knowledge of internal working of macro processor.
4.	Understanding the working of linker and loaders.

UNIT-I

Introduction to System Software: Evolution of System Software, components of system software, Translators, loaders, interpreters, compiler, assemblers.

Assemblers: Overview of assembly process, design of one pass and two pass assemblers.

Macroprocessors: Macro definition and expansion, concatenation of macro parameters, generations of unique labels, conditional macro expansion, Recursive macro expansion.

UNIT-II

Compilers: Phases of compilation process, lexical analysis, parsing, storage management optimisation. Incremental compilers, cross compilers, P code compilers.

Loaders and Linkage Editors: Basic loader functions. Relocation, program linking, linkage, editors, dynamic linking bootstrap loaders.

Other System Software: Operating system, DBMS, text editors, Interactive debugging systems.

References:

1. Leland L. Beck: System Software, An introduction to system programming, AddisonWesley.
2. D.M. Dhamdhere: Introduction to System Software, Tata McGraw Hill.
3. D.M. Dhamdhere: System Software and Operating System, Tata McGraw Hill, 1992.
4. Madrich, Stuarte: Operating Systems, McGraw Hill, 1974.
5. Stern Nancy Assembler Language Programming for IBM and IBM compatible computers,John Wiley, 1991.

Course Outcomes:

At the end of this course the student shall be able to:

CO-1.	Study the architecture of a hypothetical machine, its assembly language, macro language.
CO-2.	Understand the structure and design of assemblers, linkers and loaders.
CO-3.	Understand the concepts and theory behind the implementation of high level programming languages.
CO-4.	Get familiarize with various software development tools.
CO-5.	Understand the fundamental principles in compiler design and to identify the relationships among different phases of compiler

M.Sc. (Computer Science)
SEMESTER-III

MCS-533: Data Mining and Warehousing

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (per week):4 **Theory Marks: 75**
Total Hours: 60 **Theory Internal Assessment M: 25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

Course Objectives:

1.	Understand the functionality of the various data mining and data warehousing component Knowledge.
2.	Understand and appreciate the strengths and limitations of various data mining and data warehousing models
3.	Apply, Create and Explain the analyzing techniques of various data
4.	Analyze and describe different methodologies used in data mining and data ware housing.
5.	Evaluate and Analyze and Compare different approaches of data ware housing and data mining with various technologies.

UNIT-I

Data Warehousing:
Concepts of Data Warehousing, Difference between operational database systems and Data warehousing, Need of a separate Data Warehouse. Multidimensional Data Model.

Data Warehousing Architecture:

Steps for Design and Construction of Data-Warehouses, Three-Tier Data Warehouse Architecture, Characteristics of Data Warehousing Data, Data Marts, Types of OLAP Servers: ROLAP, MOLAP, HOLAP; Difference between Online Transaction Processing and Online Analytical Processing

UNIT-II

Data Warehouse Implementation:

Efficient Computation of Data Cubes, Indexing OLAP Data, Efficient Processing of OLAP Queries, Metadata Repository, Data Warehouse Back-End Tools and Utilities

Data Mining

Basic Concepts; Data Mining Techniques: Predictive Modeling, Database Segmentation, Link Analysis, Deviation Detection in details.

Data Mining Query Languages, Applications and Trends in Data Mining.

References:

1. Han, Kamber *"Data Mining: Concepts and Techniques"* Morgan Kaufmann.
2. RomezElmasri, ShamkantB.Navathe, *"Fundamentals of Database Systems"* Pearson Education.
3. Silberschatz, Korth, Sudershan *"Database System Concepts"* 4th Ed. McGraw Hill
4. Connolly &Begg *"Database Systems – A Practical Approach to Design, Implementation and Management*", 3rd Ed., Pearson Education.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Become familiarize with mathematical foundations of data mining tools.
CO-2.	Understand and implement classical models and algorithms in data warehouses and data mining.
CO-3.	Characterize the kinds of patterns that can be discovered by association rule mining, classification and clustering.
CO-4.	Master data mining techniques in various applications like social, scientific and environmental context.
CO-5.	Develop skills in selecting the appropriate data mining algorithm for solving practical problems.

M.Sc. (Computer Science)
SEMESTER-III

MCS-534: Concept of Core and Advanced Java

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (Per Week):4 **Theory Marks: 75**
Total Hours: 60 **Theory Internal Assessment M: 25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

Course Objectives:

1.	The objective is to equip the students with the core and advanced feature of contemporary Java which would enable them to handle complex programs relating to managing data and processes over the network.
2.	To understand fundamentals of programming such as variables, conditional and iterative execution, methods, etc.
3.	To understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries etc.
4.	The major objective of this course is to provide a sound foundation to the students on the concepts, precepts and practices, in a field that is of immense concern to the industry and business.

UNIT-I

Java Fundamentals: Features, Objects Oriented Basis, Java Virtual Machine Character Set, Operators, Data Types, Control Structures Classes, Inheritance, Polymorphism, Packages & Interfaces, Stream IO Classes, Exception Handling.

UNIT-II

Multithreading: Java Thread model, Thread Priorities, Synchronization, Interthread communication, Suspending, resuming & stopping thread.

Applet: Applet basics, Applet architecture, Display, Repaint, Parameter Passing.

Telnet, FTP, Web Server and their implementation in Java.

References:

1. Complete Reference: Java, Herbert Schidit & Pattrick Naugthon TMH Publications.
2. The java Tutorial Continued by Compione, Walrath, huml Sun Java Tutorial Team, Addison Wessley.
3. Java Black Book Steven Holzner OT Dreamtech Press, www.igdbooksindia.com
4. Beginning Programming with Java For Dummies Barry A. Burd

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Design and implement programs in the Java programming language that make strong use of classes and objects.
CO-2.	Learn to print formatted text to the console output and read/parse console input text using a Scanner object.
CO-3.	Study logical constructs for branching and loops as well as use iterate objects when appropriate.
CO-4.	Define classes and methods. In addition, students will learn the basics of polymorphism through use of super-classes and interfaces. Finally, students will develop an understanding of the Java language class hierarchy including the cosmic Object super class.
CO-5.	Learn to create and access arrays and array lists, including those with Books Prescribed to generalized objects types.

M.Sc. (Computer Science)
SEMESTER-III

MCS-535: Network Programming

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (per week):4 **Theory Marks: 75**
Total Hours: 60 **Theory Internal Assessment M: 25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

Course Objectives

1.	Imparting thorough knowledge of networking concepts.
2.	Applying core programming concepts to design and manage various networks.
3.	Real life usage of network protocols through advanced programming concepts.

UNIT-I

Introduction to Sockets, Concept of Zombies, Daemon Processes, Super servers, Concurrent versus Iterative servers, Protocol Independence, Error Handling: Wrapper functions, OSI Model, Unix standards.

TCP Connection establishment & Termination, Port Numbers and Concurrent Servers, Protocol Usage by common Internet Applications for TCP.

UNIT-II

UDP Communication Semantics, UDP Echo Server, Echo Client protocol usage by common internet application for UDP.

Sockets Address Structures, Byte ordering & Manipulation Functions, TCP Socket System Calls, TCP Client-Server E.g., I/O Multiplexing, Signal Handling in Concurrent Servers.

Socket Options, Elementary Names Address Conversions, Ipv4 and Ipv6 Interoperability.

References:

1. Networking Programming, W. Richard Stevens, Pearson Education.
2. Advanced Programming in UNIX Environment, W. Richard Stevens, Pearson Education.
3. Linux Network Programming, Keir Davis, John W.Turner, NathanYokom.
4. Hands- on Network Programming with C, Lewis Van Winkle.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Developing applications based on techniques such as IPv4, IPv6 addressing schemes, child process creation using fork etc.
CO-2.	Elaborating existence of various system processes such as Zombies, Daemon processes etc.
CO-3.	Design sockets for implementation of client-server programming using java programming language.
CO-4.	Gain in-depth knowledge about various types of ports and their allotments in networks.
CO-5.	Post completing this course, a student will be able to make career in the field of network administration/management.

M.Sc. (Computer Science)
SEMESTER-III

MCS-536P
Programming Laboratory – III
(Based on Advanced Java and Network Programming)

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (Per Week): 4 **Practical Marks: 75**
Total Hours:60 **Practical Internal Assessment M: 25**

Course Objectives:

1.	To introduce the object-oriented programming concepts.
2.	To understand object-oriented programming concepts and apply them in solving problems.
3.	To introduce the principals of inheritance and polymorphism and demonstrate how they relate to design of abstract class.
4.	To introduce the implementation of packages and interfaces.
5.	To introduce the concept of exception handling and multithreading.

Programming Laboratory based on Advanced Java and Network Programming

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Understand the concept of OOPs as well as the purpose and uses principal of inheritance, polymorphism in encapsulation and method overloading.
CO-2.	Identify classes, objects, members of a class and the relationship among them. needed for a specific problem.
CO-3.	Create a java applications programs using sound oops practices.
CO-4.	Develop programs using the java collection API as well as the java standard class library.
CO-5.	Develop and understand exception handling.

M.Sc. (Computer Science)
Semester IV

Sr. No.	Course Code	Course Name	Theory	Internal Assessment	Practical	Total	Page No.
1	MCS-541	Advanced Web Technologies using ASP.NET	75	25	-	100	42-43
2	MCS-542	Microprocessor and its Applications	75	25	-	100	44-45
3	MCS-543	Optional Paper Option (i) : Object Oriented Modelling, Analysis and Design Option (ii): Big Data Analytics Option (iii): Natural Language Processing	75	25	-	100	46-51
4	MCS-544	Programming Laboratory-IV (Based on Advanced Web Technologies using ASP.NET)	75	25	-	100	52
5	MCS-545P	Project Work	-	50	150	200	53
					Total Marks	**600**	

M.Sc. (Computer Science)
SEMESTER-IV
MCS-541: Advanced Web Technologies using ASP.NET

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (per week):4 **Theory Marks: 75**
Total Hours: 60 **Theory Internal Assessment M: 25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from UNIT-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from UNIT-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

Course Objectives:

1.	The students will Study the architecture of Dot Net framework.
2.	Understand the basic principles of website development using IDE.
3.	Learn advanced windows and web development techniques using dot NET.

UNIT-I

Introduction to .Net Framework
Developing console applications, C# Type Conversion Methods, boxing and unboxing, compiling & building projects, using command line argument, compiling a C# program using commandLine utility CSC.EXE
Introduction to Web Applications:

Standard Controls: Display information, accepting user input, submitting form data, displaying images, Using the panel control, Using the hyperlink control.

Validation Controls: Using the required field validator control, Using the range validator control using the compare validator control, Using the regular expression validator control, Using the custom validator control, Using the validation summary controls.

Rich Controls: Accepting file uploads, displaying a calendar, displaying advertisement, displaying different page views, Displaying a wizard.

Designing Website with Master Pages: Creating master pages, modifying master page content, Loading master page dynamically.

SQL Data Source Control: Creating database connections, executing database commands, Using ASP.NET parameters with the SQL data source controls, programmatically executing SQL data source commands, Caching database data with the SQL data Source controls.

UNIT-II

List Controls: Dropdown list control, Radio button list controls, list box controls, bulleted list controls, custom list controls.

Grid View Controls: Grid view control fundamentals, using field with the grid view control, working with grid view control events extending the grid view control.

Building Data Access Components with ADO.NET: Connected the data access, Disconnected data access, executing a synchronous database commands, Building data base objects with the .NET framework.

Maintaining ApplicationState: Using browser cookies, using session state, Using profiles.

Caching Application Pages and Data: page output caching, partial page caching, data source caching, data caching, SQL cache dependences.

References:

1. ASP.NET 3.5: Stephen Walther, Pearson Education, 2005
2. ASP.NET 4.0: In Simple Steps by Kogent Learning Solutions Inc.
3. ASP.NET 4.5: Black Book by Kogent Learning Solution Inc.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Evaluate C# and the .NET framework namespace contents.
CO-2.	Develop the console and GUI applications using C# .Net.
CO-3.	Set up various navigation techniques for integrating web pages within the site.
CO-4.	Create the dynamic web page using ASP.NET Controls which interact with databases.
CO-5.	Manage cookies and sessions as state management techniques.

M.Sc. (Computer Science)
SEMESTER-IV

MCS-542: Microprocessor and Its Applications

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (per week):4 **Theory Marks: 75**
Total Hours:60 **Theory Internal Assessment M: 25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

Course Objectives:

The objective of this course is to:

1.	Understand the future trends in microprocessor.
2.	Learn detailed software and hardware architecture of microprocessor.
3.	Analyse how different peripherals are interfaced with microprocessor.

UNIT-I

Introduction: Introduction to Microprocessor, General Architecture of Microcomputer System. Microprocessor Units, Input unit, Output unit, Memory unit and auxiliary storage unit.

Architecture of 8086/8088 Microprocessor: Description of various pins, configuring the 8086/8088 microprocessor for minimum and maximum mode systems, Internal architecture of the 8086/8088 microprocessor, system clock, Bus cycle, Instruction execution sequence.

Memory Interface of 8086/8088 Microprocessor: Address space and data organization, generating memory addresses, hardware organization of memory address space, memory bus status code, memory control signals, read/write bus cycles, program and datastorage memory, dynamic RAM system.

UNIT-II

Input/Output Interface of the 8086/8088 Microprocessor: I/O interface, I/O address space and data transfer, I/O instructions, I/O bus cycles, Output ports, 8255A Programmable Peripheral Interface (PPI), Serial communication interface (USART and UART) – the RS- 232 C interface, **Interrupt Interface of 8086/8088 Microprocessor:** Types of Interrupt, Interrupt Vector Table (IVT).

References:

1. Walter Triebel: The 8086 Microprocessor – Architecture, Software and Interfacing Techniques, PHI, Delhi.
2. Walter Triebel, Avtar Singh: The 8088 and 8086 Microprocessor – Architecture, Software and Interfacing Techniques, PHI, Delhi.
3. Walter Triebel: The 8088 Microprocessor – Architecture, Software and Interfacing Techniques, PHI, Delhi.
4. Douglas V. Hall: Microprocessors and Interfacing – Programming and Hardware, Tata McGraw Hill Publishing Company Ltd., New Delhi.
5. Peter Abel: IBM PC Assembly Language and Programming, PHI, Delhi.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Illustrate the architecture of 16 bit 8088 /8086 microprocessor.
CO-2.	Use the various addressing modes and data transfer instructions of the microprocessor.
CO-3.	Lern about higher processor architecture and embedded systems.
CO-4.	Understand the working of Programmable Peripheral interface.
CO-5.	Learn the operations and interfacing techniques of 8088/8086 microprocessor

M.Sc. (Computer Science)
SEMESTER-IV

MCS-543
Option (i)
Object Oriented Modelling, Analysis and Design

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (Per Week): 4 **Theory Marks: 75**
Total Hours:60 **Theory Internal Assessment M: 25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from UNIT-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from UNIT-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

Course Objectives:

At the end of this course, the students will know:

1.	The importance of modeling in the software development life cycle.
2.	The UML notation and symbols.
3.	The object-oriented approach to analyzing and designing systems and software solutions.
4.	How to Employ the UML notation to create effective and efficient system designs.
5.	To inculcate necessary skills to handle complexity in software design.

UNIT-I

Object Orientation, OMT Methodology, Object and Class, Link and Association Generalization, Aggregation Multiple Inheritance, Packages.

Object Meta Modeling, Metadata and Metamodels, Functional ModelingPseudocode with the Object navigation Notation, ONN Constructs, Combining ONN Constructs.

UNIT-II

Analysis**:** Object Model, Data Dictionary, Dynamic Model, Functional Model.

System Design :- Devising an Architecture, Database Management Paradigm, Object Model, Elaborating the functional Model, Evaluating the Quality of Design Model.

References:

1. Object Oriented Modeling and Design By Michael Blaha, William Premerlani, and Prentice Hall
2. Object-Oriented Analysis and Design with Applications by Booch, Pearson
3. Head First Object-Oriented Analysis and Design: A Brain Friendly Guide to OOA&D by Brett D. McLaughlin, David West and Gary Pollice
4. Object - Oriented Analysis and Design Using UML: Introduction to Unified Process and Design Patterns by Matha

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Select the basic elements of modeling such as Things, Relationships and Diagrams depending on the views of UML Architecture and SDLC.
CO-2.	Apply basic and Advanced Structural Modeling Concepts for designing real time applications.
CO-3.	Design Class and Object Diagrams that represent Static Aspects of a Software System.
CO-4.	Analyse Dynamic Aspects of a Software System using Use Case, Interaction and Activity Diagrams.
CO-5.	Apply techniques of State Chart Diagrams and Implementation Diagrams to model behavioral aspects and Runtime environment of Software Systems.

M.Sc. (Computer Science)
SEMESTER-IV

MCS-543
Option (ii)
Big Data Analytics

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (Per Week):4 **Theory Marks: 75**
Total Hours: 60 **Theory Internal Assessment M: 25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from UNIT-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from UNIT-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

Course objectives:

The objective of this course is :

1.	To study the basic technologies that forms the foundations of Big Data.
2.	To study the programming aspects of cloud computing with a view to rapid prototyping of complex applications.
3.	To understand the specialized aspects of big data including big data application, and big data analytics on Structured, Unstructured Data.
4.	To study different types Case studies on the current research and applications of the Hadoop and big data in industry.

UNIT-I

An Overview of Big Data and Big Data Analytics. Understanding Hadoop Ecosystem (Hadoop Distributed File System, MapReduce, Hadoop YARN, HBase, Combining HBaseand HDFS, Hive, Pig, Sqoop, ZooKeeper, Flume, Oozie). MapReduce Framework, Techniques to Optimize MapReduce Jobs, Role of HBase in Big Data Processing

Developing Simple MapReduce Application, Points to Consider while Designing MapReduce. Controlling MapReduce Execution with InputFormat, Reading Data with Custom RecordReader, Organizing Output Data with OutputFormats, Customizing Data with RecordWriter, Optimizing MapReduce Execution with Combiner, Controlling Reducer Execution with Partitioners.

UNIT-II

YARN Architecture, Working of YARN, YARN Schedulers, Backward Compatibility withYARN, YARN Configurations, YARN Commands, YARN Containers. Introduction to NoSQL. Types of NoSQL Data Models, Schema-Less Databases, Materialized Views, Distribution Models.
Analytical Approaches, Introducing to various Analytical Tools, Installing R, Handling Basic Expressions in R, Variables in R, Working with Vectors, Storing and Calculating Values in R, Creating and Using Objects, Interacting with Users, Handling Data in R Workspace, Executing Scripts, Reading Datasets and Exporting Data from R, Manipulating and Processing Data in R, Working with Functions and Packages in R, Performing Graphical Analysis in R, Techniques Used for Visual Data Representation, Types of Data Visualization

References:

1. Big Data, Black Book by DT Editorial Services, Dreamtech Press.
2. Big Data Computing and Communications edited by Yu Wang, HuiXiong, ShlomoArgamon, XiangYang Li, JianZhong Li Springer
3. Big Data Analytics BeyondHadoop by Vijay SrinivasAgneeswaran, FT Press.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Identify Big Data and its Business Implications.
CO-2.	Get knowledge about HDFS Concepts and Interfacing with HDFS. And learns R language.
CO-3.	List the components of Hadoop and Hadoop Eco-System.
CO-4.	Access and Process Data on Distributed File System.
CO-5.	Manage Job Execution in Hadoop Environment and Develop Big Data Solutions using Hadoop Eco System.

M.Sc. (Computer Science)

SEMESTER-IV

MCS-543
Option (iii)
Natural Language Processing

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (per week): 4 **Theory Marks: 75**
Total Hours:60 **Theory Internal Assessment M: 25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

Course objectives:

The objective of this course is to:

1.	Study the basic technologies that forms the foundations of NLP.
2.	Study the significance of natural language processing in solving real-world problems.
3.	Study to map the appropriate processing technique to a problem and implement the technique.

UNIT-I

Introduction: Natural Language Processing (NLP), Challenges of NLP, NLP Applications, Processing of Indian Languages. Words and Word Forms: Morphology fundamentals; Morphological Diversity of Indian Languages; Morphology Paradigms; Finite State Machine Based Morphology; Automatic Morphology Learning; Shallow Parsing; Named Entities; Maximum Entropy Models; Random Fields, Scope Ambiguity and Attachment Ambiguity resolution.

Structures : Theories of Parsing, Parsing Algorithms; Robust and Scalable Parsing on Noisy Text as in Web documents; Hybrid of Rule Based and Probabilistic Parsing; Scope Ambiguity and Attachment Ambiguity resolution.

UNIT-II

Machine Translation: Need of MT, Problems of Machine Translation, MT Approaches, Direct Machine Translations, Rule-Based Machine Translation, Knowledge Based MT System, Statistical Machine Translation, UNL Based Machine Translation, Translation involving Indian Languages.

Meaning: Lexical Knowledge Networks, WorldNet Theory; Indian Language Word Nets and Multilingual Dictionaries; Semantic Roles; Word Sense Disambiguation; WSD and Multilinguality; Metaphors.

Speech Recognition: Signal processing and analysis method, Articulation and acoustics, Phonology and phonetic transcription, Word Boundary Detection; Argmax based computations; HMM and Speech Recognition.

References:

1. Allen J., Natural Language understanding, Benjamin/Cunnings, (1987).
2. Siddiqui and Tiwary U.S., Natural Language Processing and Information Retrieval, Oxford University Press (2008).
3. Jensen K., Heidorn G.E., Richardson S.D., Natural Language Processing: The PLNLP Approach, Springer (2013).
4. Roach P., Phonetics, Oxford University Press (2012).
5. Jurafsky, Dab and Martin, James, Speechand Language Processing, Second Edition, Prentice Hall, 2008.

Course Outcomes:

At the end of the course, students will be able to-

CO-1.	Describe the fundamental concepts and techniques of natural language processing.
CO-2	Distinguish among the various techniques, taking into account the assumptions, strengths, and weaknesses of each.
CO-3.	Use appropriate descriptions, visualizations, and statistics to communicate the problems and their solutions.
CO-4.	Analyze large volume text data generated from a range of real-world applications.

M.Sc. (Computer Science)
SEMESTER-IV

MCS-544 P
Programming Laboratory – IV
(Based on Advanced Web Technologies using ASP.NET)

Time: 3 Hrs. **Total Marks: 100**
Credit Hourse (Per Week): **Practical Marks: 75**
Total Hours: 60 **Practical Internal Assessment M: 25**

Course Objectives:

1.	To study the architecture of Dot Net framework and implement it using C# programming and visual studio.
2.	Understand the basic principles of website development using IDE and implement it.
3.	Learn advanced web development techniques using cookies and session, database connectivity and user profiles.

Programming Laboratory based on Advanced Web Technologies using ASP.NET

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Implement C# and the .NET framework namespace contents.
CO-2.	Develop the console and GUI applications using C# .Net.
CO-3.	Set up various navigation techniques for integrating web pages within the site.
CO-4.	Create the dynamic web page using ASP.NET Controls which interact with databases.
CO-5.	Manage cookies and sessions as state management techniques.

M.Sc. (Computer Science)
SEMESTER-IV

MCS-545P
Project Work

Time: 3 Hrs. **Total Marks: 200**
Credit Hours (Per Week): **Project Marks: 150**
Total Hours: 60 **Project Internal Assessment M: 50**

Course Objectives:

1.	Develop skills in presentation and discussion of research topics in a public forum.
2.	Exposure to a variety of research projects and activities in order to enrich their academic experience
3.	It makes the student confident in designing an Online Project with advanced technologies on their choice
4.	Students are trained to meet the requirements of the industry.

The Project is to be prepared based on some current problems from industry / business / academic domain using some currently available technology / platform.

Note:
1. The end semester project work evaluation is to be conducted by following panel of examiners:-
   a. Internal Examiner
   b. External Examiner
   c. Head/Head's nominee
2. The Project are to be submitted as per the common ordinances for P.G. courses under semester system.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Carry out time planning for the project.
CO-2.	Follow correct grounding and shielding practices
CO-3.	Do effective trouble-shooting of the mini project.
CO-4.	Demonstrate a through and systematic understanding of project contents.
CO-5.	Understand methodologies and professional way of documentation and communication.
CO-6.	Know the key stages in development of the project.

SYLLABUS FOR THE BATCH FROM THE YEAR 2022 TO YEAR 2024

Programme Code: MIT

Programme Name: M.Sc. (Information Technology)

(Semester I-IV)

Examinations: 2022-2024

P.G. Department of Computer Science & Applications

Khalsa College, Amritsar

Programme name: M.Sc. (Information Technology)
Programme code: MIT
Programme Duration :2years

Programme Objectives

1.	To impart sound knowledge in Inforamtion Technology and to enable students to apply the acquired skills creatively in computer and related technologies in practical scenarios.
2.	To effectively utilize knowledge of computing principles to develop sustainable solutions to the present and the prospective computing problems.
3.	To effectively initiate, create and to communicate innovation through social, legal, ethical, and cultural issues inherent in the discipline of computing concepts and solutions to bridge the gap between computing industry experts and business leaders.
4.	To exhibit computing expertise through corporate leadership and entrepreneurship;
5.	To address in the broad areas of multi-disciplinary in nature, and to keep pace with advances in Information Technology.

Program Specific Outcomes (PSOs):

PSO-1	This programme provides understanding about techniques, technologies and methods used in managing and implementing information technology systems.
PSO-2	Widens and deepens the understanding of computing technologies and covers high level concepts that enable the effective management and planning of IT projects and services.
PSO-3	Students gain knowledge in the areas like Artificial Neural Netwoks, image processing, Programming languages, Database Technologies, Advanced Operating System, Mobile Technologies and core computing subjects. This make students employable according to current demand of IT Industry as they understand all dimensions of the concepts of software application and projects.

M.Sc. (Information Technology)
Semester I

Sr. No.	Course Code	Course Name	Marks				Page No.
			Theory	Internal Assessment	Practical	Total	
1	MIT-411	Analysis &Design of Embedded Systems	75	25	-	100	57-58
2	MIT-412	Distributed Computing	75	25	-	100	59-60
3	MIT-413	Advanced Computer Organization and Architecture	75	25	-	100	61-62
4	MIT-414	Network Operating System	75	25	-	100	63-64
5	MIT-415	R Programming	75	25	-	100	65-66
6	MIT-416P	Programming Laboratory-I(R Programming)	-	25	75	100	67
					Total Marks	**600**	

M.Sc. (Information Technology)
SEMESTER-I

MIT-411: Analysis and Design of Embedded Systems

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (per week):4 **Theory Marks: 75**
Total Hours:60 **Theory Internal Assessment M: 25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
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Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

Course Objectives:

1.	It helps to implement small programs to solve well-defined problems on an embedded platform.
2.	It helps to develop familiarity with tools used to develop in an embedded environment.
3.	It helps to discuss the major components that constitute an embedded system.
4.	To get students familiar with the typical problems and constraints that arise when designing and developing an embedded system.

Unit -I

Embedded systems and their characteristics, challenges and issues in embedded software development, Hardware and electronics fundamentals for software engineers, categories of different processor, microprocessor and micro controller,
Study of embedded processors and systems like PIC, AVR, micro controller, Implementation & working of 68000-series computer, Implementation & working of DSP based controller.

Unit -II

Operating system services: different categories of operating system, kernel architecture, and root file system contents, storage device manipulations, setting up boot loader

Development tools, preliminary programming, determining the requirement, design the system architecture, system integration, commissioning the system, Hardware software code sign, and case studies in different embedded systems.

Refereces:

1. Ken Arnold, "Embedded Controller Hardware Design", Newnes, 2001.
2. Arnold S. Berger, "Embedded Systems Design: An Introduction to Processes, Tools and Techniques", CMP books, 2001.
3. Fran Vahid, Tony D. Givargis, "Embedded Systems Design – A Unified Hardware/Software Introduction, Wiley, 2001
4. E. A. Lee and S. A. Seshia, "Introduction to Embedded Systems".

Course Outcomes (COs):

On Completing the course, the students will be able to:

CO-1.	Understand different components of microcontroller and their interactions.
CO-2.	Learn debugging techniques for an embedded system.
CO-3.	Understand key concepts of an embedded system like IO timers, Interrupts, interaction with peripheral devices.

M.Sc. (Information Technology)
SEMESTER-I

MIT-412: Distributed Computing

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (per week):4 **Theory Marks: 75**
Total Hours: 60 **Theory Internal Assessment M: 25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

Course Objectives:

1.	This course is an introduction to the design of distributed systems and algorithms that support distributed computing.
2.	It aims to provide a practical exposure into the design and functioning of existing distributed systems.

UNIT -I

Introduction: Motivation, objectives, characterization & classification of distributed systems. Distributed system architecture. Hardware & software issues.
Communication: Layered protocols, Client server protocols, RPC, group communication.
Coordination, synchronization & consistency: Logical clocks, Physical clocks, mutual exclusion, election algorithms, atomic broadcast, sequential consistency transaction distributed consensus, Threads: Thread synchronization, implementation issues, and threads vs. RPC. Models of distributed computing: Client server and RPC, RPC architecture, exceptions, underlying protocols, IDL, marshalling etc.

UNIT -II

Group models and peer to peer: Groups for service replication/ reliability, groups for parallelism / performance, client/ server vs. peer-to-peer, multicast, atomic broadcast.

Distributed file system: Security, Naming/ location transparency, R/W semantics, cache coherence, replication.

Distributed shared memory: DSM architecture, consistency models and relation to caching, release consistency, comparison with message passing and RPC.

Security: Introduction, security techniques, cryptographic algorithms, authentication and access control.

Case study: CORBA, MACH

References:

1. Distributed systems, concepts and design, 3rd Edition, Addison Wesley by George Colouris, Jean Dollimore and Tim Kinder berg, 2006.
2. Distributed system, 2nd Edition, Addison Wesley by Sape Mullender, 2006.
3. Distributed Computing: Fundamentals, Simulations, and Advanced Topics, Wiley, by Jennifer Welch Hagit Attiya
4. "Distributed Systems – Principles and Paradigms" by Andrew S Tanenbaum and Maaten Van Steen

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Demonstrate knowledge of the basic elements and concepts related to distributed system technologies.
CO-2.	Demonstrate knowledge of the core architectural aspects of distributed systems.
CO-3.	Design and implement distributed applications.
CO-4.	Demonstrate knowledge of details the main underlying components of distributed systems (such as RPC, file systems).
CO-5.	Use and apply important methods in distributed systems to support scalability and fault tolerance.

M.Sc. (Information Technology)
SEMESTER-I

MIT-413: Advanced Computer Organization and Architecture

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (per week):4 **Theory Marks: 75**
Total Hours: 60 **Theory Internal Assessment M: 25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

Course Objectives:

1.	To make students know about the Parallelism concepts in Uniprocessor systems.
2.	To give the students an elaborate idea about the different memory systems and buses.
3.	To introduce the advanced processor architectures to the students.
4.	To make the students know about the importance of multiprocessor and pipeline computers.
5.	To study about data flow computer architectures.

UNIT -I

Paradigms of Computing: Synchronous – Vector/Array, SIMD, Systolic
Asynchronous – MIMD, reduction Paradigm, Hardware taxonomy: Flynn's classification, Software taxonomy: Kung's taxonomy, SPMD.
Abstract Parallel Computational Models: Combinational circuits, Sorting Network, PRAM Models, Interconnection RAMs.
Parallelism in Uniprocessor Systems: Trends in parallel processing, Basic Uniprocessor Architecture, Parallel Processing Mechanism.
Parallel Computer Structures: Pipeline Computers, Array Computers, Multiprocessor Systems Architectural Classification Schemes: Multiplicity of Instruction-Data Streams, Serial versus Parallel Processing, Parallelism versus Pipelining

UNIT –II

Pipelining : An overlapped Parallelism, Principles of Linear Pipelining, Classification of Pipeline Processors, General Pipelines and Reservation Tables
Principles of Designing Pipelined Processors: Instruction Prefetch and Branch Handling, Data Buffering and Busing Structures, Internal Forwarding and Register Tagging, Hazard Detection and Resolution
Superscalar and Super pipeline Design: Superscalar Pipeline Design, Super pipelined Design Structures and Algorithms for Array Processors: SIMD Array Processors, SIMD Computer Organizations, Masking and Data Routing Mechanisms, Inter-PE Communications

References:

1. Computer Architecture and Parallel Processing, Faye A. Briggs, McGraw-Hill International Editions, 2003
2. Computer Systems Organization & Architecture, John d. Carpinelli, Addison Wesley, 2002

Course Outcomes:

At the end of this course the student shall be able to:

CO-1.	Demonstrate concepts of parallelism in hardware/software.
CO-2.	Understanding the parallel computational models.
CO-3.	Understanding the parallel processing mechanism in uniprocessor systems.
CO-4.	Describe architectural features of advanced processors.
CO-5.	Interpret performance of different pipelined processors.
CO-6.	Become familiar with the concept of pipeline, array and multiprocessor systems.

M.Sc. (Information Technology)
SEMESTER-I

MIT-414: Network Operating Systems

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (per week):4 **Theory Marks: 75**
Total Hours: 60 **Theory Internal Assessment M: 25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

Course Objectives:

At the end of the course, the students will be able to:

1.	Learn the functions which are unique to network operating systems and various types of NOS.
2.	Install and configure a network operating system on different platforms.
3.	Install and configure common network utilities such as DNS and NFS
4.	Install and configure common network servers such as SMTP and FTP servers

UNIT-I

Introduction of various Network Operating Systems: MySQL, Unix/Linux OR any other OS.
Overview of Network Operating System: Introduction, Architecture, Shell, Kernel, File System, Hardware requirements, Active Directory, Clustering & Load Balancing, Storage Management, Editors, Networking and Communication features, Licensing
Disk Management: Terminology and Concepts, Managing Disks, Managing Basic and Dynamic Disks, Disk Quotas, Disk Fragmentation, Remote Storage, RAID and Mirroring.
Servers: Managing DHCP, IIS, WINS, DNS and Proxy servers.

Unit-II

User, Group and Computer Accounts: Creating and Managing user, Group and Computer Accounts, Managing Access Controls, Troubleshooting Accounts.

Performance Monitoring and Security: Task Management, System Monitoring, Performance Logs and Alerts, Monitoring Memory, Network and Process Objects, Auditing Security Events, Audit Policy and Event Viewer.

Telnet and FTP, Distributed Systems.

Case and Comparative Studies of MySQL, Unix/Linux OR any other OS.

References:

1. MCSA/MCSE; Exam 70-291, Implementing, Managing and Maintaining a Windows Server 2003 Network Infrastructure by Shinder Deborah Littlejohn, Shroff Publishers, 7th Reprint, 2005.
2. Networking: The Complete Reference by Craig Zacker, Tata McGraw-Hill, Seventh Reprint, 2004.
3. Unix Concepts and Applications, Sumitabha Das,Third Edition, Tata McGraw Hill, First Reprint, 2003.
4. Unix and Shell Programming: A Text Book, Behrouz A. Forouzen, Second Reprint, 2005.
5. Linux: A Practical Approach, B.Mohamad Ibrahim, Second Reprint, 2006.
6. Linux Security, Hontanon Ramon J., 2001.
7. The Internet: Douglas E. Comer, 3rd Edition, 2003.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Learn about Network Operating System and its types and how it is important for Computer System and understands the various services provided at different level.
CO-2.	Learn real life applications and manage Network Operating System.
CO-3.	Learn client-server and peer-to-peer models of distributed systems and creation of directories.
CO-4.	Understand protection and security provided to systems and various permission available to different types of users and admin.
CO-5.	Understand Telnet and FTP, Distributed Systems. Case and Comparative Studies of MySQL, Unix/Linux OR any other OS.

M.Sc. (Information Technology)
SEMESTER-I

MIT-415: R Programming

Time: 3 Hrs. **Total Marks: 100**
Credit Hourse (Per Week):4 **Theory Marks: 75**
Total Hours: 60 **Theory Internal Assessment M: 25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

Objectives:

1.	This course introduces R, which is a popular statistical programming language. The course covers data reading and its manipulation using R, which is widely used for data analysis internationally.
2.	Understand and implement functions that support linear modelling, non-linear modelling, classical statistics, classifications, clustering and more. The course also covers different control structures and design of user-defined functions.
3.	Learn how to develop the program in R Programming. Learn how to develop an open-source scripting language for predictive analytics and data visualization.

UNIT-I

Downloading and installation of R and RStudio. Introducing to R, and Rstudio. Help functions in R, Vectors, Common Vector Operations, Using all and any function, subletting of vector. Creating matrices, Matrix operations, Applying Functions to Matrix Rows and Columns, Adding and deleting rows and columns , lists, Creating lists, general list operations, Accessing list components and values, applying functions to lists, recursive lists.
Creating Data Frames – Matrix-like operations in frames , Merging Data Frames, Applying

functions to Data frames, Factors and Tables , factors and levels , Common functions used with factors Control statements: Loops, looping Over Nonvector Sets, if-else , writing user defined function, scope of the variable, R script file.

UNIT-II

Input/ Ouput: scan () , readline () Function, recursion, replacement functions, Printing to the Screen Reading and writing CSV and text file. Math functions, function for statistical distributions, linear algebra operations on vector and matrices, Basic of simulation, simulation programming in R: Built random variable generator, object –oriented programming: S3 generic functions, writing S3 and S4 Classes.

String manipulation, Graphics in R: Graph Syntax (title, xlabel, ylabel, pch, lty, col.), Simple graphics (Bar, Multiple Bar, Histogram, Pie, Box-Plot, Scatter plot, qqplot), Low-level and High-Level plot functions, par() command to generate multiple plots. Customizing graphs, saving graphto file, performance enhancement: speed and memory, functional programming and memory issue, Debugging.

References:

1. Dennis, B. (2013): The R Student Companion, Taylor & Francis Group.
2. Matloff, N. (2011): The Art of R Programming: A Tour of Statistical Software Design,
3. William. Lander, J. P. (2014): R for Everyone: Advanced Analytics and Graphics, Addison-Wesley Data & Analytics Series.

Course Outcomes:

At the end of this course the student shall be able to:

CO-1.	Know the key stages in development of the project.
CO-2.	Install, load and deploy the required packages, and build new packages for sharing and reusability.
CO-3.	Utilize R Data types for developing programs and learn all the basics of R-Programming (Data types, Variables, and Operators.
CO-4.	Join columns and rows in a data frame using bind functions, developing packages, data frames, and string manipulation functions.
CO-5.	Learning with different file systems and CSV file systems.
CO-6.	Visualize and summarize the data and design application with database connectivity for data analysis.

M.Sc. (Information Technology)
SEMESTER-I

MIT-416P
Programming Laboratory – I
(R Programming)

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (per week):4 **Practical Marks: 75**
Total Hours:60 **Practical Internal Assessment M: 25**

Course Objectives:

1.	Understand and implement functions that support linear modelling, non-linear modelling, classical statistics, classifications, clustering and more.
2.	Learn how to develop the program in R Programming.
3.	Learn how to develop an open-source scripting language for predictive analytics and data visualization.

Programming laboratory based on R Programming

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Study the installation of the R Programming Environment.
CO-2.	Utilize R Data types for developing programs and Learn all the basics of R-Programming (Data types, Variables, and Operators.
CO-3.	Study the implementation of R-loops with different examples, learn the basics of functions in R and implement with example.
CO-4.	Join columns and rows in a data frame using bind functions, developing packages, data frames, and string manipulation functions.
CO-5.	Learning with different file systems and CSV file systems.

M.Sc. (Information Technology)
Semester II

Sr. No.	Course Code	Course Name	Marks				Page No.
			Theory	Internal Assessment	Practical	Total	
1	MIT-421	Mobile Computing	75	25	-	100	69-70
2	MIT-422	Optional Paper Option (i): Distributed Databases Option (ii): Cloud Computing	75	25	-	100	71-74
3	MIT-423	Image Processing	75	25	-	100	75-76
4	MIT-424	Fuzzy Systems	75	25	-	100	77-78
5	MIT-425	Network Design and Performance Analysis	75	25	-	100	79-80
6	MIT-426P	Programming Laboratory-II	-	25	75	100	83
					Total Marks	**600**	

M.Sc. (Information Technology)

SEMESTER-II
MIT-421: Mobile Computing

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (per week):4 **Theory Marks: 75**
Total Hours:60 **Theory Internal Assessment M: 25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

Course Objectives:

1.	To provides complete knowledge of mobile communication process.
2.	To provide leaning about various components used in mobile telephony such as mobile station, base station, switching centres etc.
3.	To teach working model used behind the mobile communication and elaborating the relation between wired and wireless systems of communications.

UNIT-I

INTRODUCTION TO MOBILE COMPUTING: Introduction and need for Mobile Computing Mobility and portability, Mobile and Wireless devices, Applications, Brief History of wireless communication. Current Wireless Systems: Overview of Paging Systems, Cordless Phones, Cellular Telephone Systems, Satellite Communication, Wireless LANs, Bluetooth, Modern
WIRELESS TRANSMISSION: General Concepts of multiplexing and modulation, Spread Spectrum, Cellular Systems
CELLULAR CONCEPT: Introduction. Frequency reuse. Channel Assignment Strategies. Handoff Strategies. Interference and System Capacity, Trunking and Grade of Service. Improving Coverage & Capacity in Cellular Systems
MEDIUM ACCESS CONTROL LAYER: Why specialized MAC- hidden and exposed terminals, near and far terminals, General Concepts and comparison of SDMA, FDMA, TDMA, CDMA
MOBILE IP- Goals, assumptions and requirements, Entities and terminologies, Agent Discovery, Registration, Tunnelling and encapsulation, Reverse Tunnelling, IPv6 , IP micro-mobility support –

Cellular IP, Hawaii, Hierarchical, mobile IPv6 , Mobile Routing-(Destination sequence distance Vector, Dynamic Source Routing, Alternative Metrics, Adhoc Routing Protocols -Flat, Hierarchical, Geographic-position-assisted)

UNIT -II

Mobile TCP: Traditional TCP , Congestion Control, Slow start, Fast retransmit / Fast recovery , Implications on mobility , Classical TCP improvements , Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit / Fast recovery, Transmission / Timeout freezing, Selective Retransmission, Transaction oriented TCP , TCP over 2.5/3G wireless networks

GSM: Mobile Services (Bearer, Tele-and-supplementary services),
System Architecture –(Radio subsystem , Network and switching subsystem , Operation subsystem), Protocols –(Localization and calling , Handover), Value Added Services –(SMS: Architecture, Mobile Originated and Mobile Terminated procedures) , Cell Broadcast Service:(Architecture, Message Transfer Procedure) , MMS:(Architecture, Protocol framework, Message Transfer Procedure) , Location Services:(Logical Reference Model, Control Procedures, Network, Architecture, determination of Location Information, Location based services), GPRS

INTRODUCTION TO 3G MOBILE NETWORKS: UMTS - System architecture, radio interface, UTRAN – (Architecture, Functions of RNC, Core network), Handover – (Hard and soft handover)
WIRELESS APPLICATION PROTOCOL-Architecture, Wireless datagram protocol, Wireless transport layer security. Wireless transaction protocol, Wireless session protocol, Wireless application environment, WAP Push Architecture, protocols

References:

1. Mobile Communications: Jochen Schiller, Pearson Education, 2nd Edition
2. Mobile Computing: Implementing Pervasive Information and Communications Technologies by Shambhu Upadhyaya, Kevin Kwiat, Abhijit Chaudhury, Springer
3. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, “Principles of Mobile Computing”, Springer, 2003.
4. William.C.Y.Lee,“Mobile Cellular Telecommunications-Analog and Digital Systems”, Second Edition,Tata Mc Graw Hill Edition ,2006.

Course Outcomes:

At the end of this course the student shall be able to:

CO-1.	Get knowledge about working process of wireless communications.
CO-2.	Implementation knowledge of mobility, portability through various Wireless Communication Medias.
CO-3.	Get in-depth knowledge about cellular call management systems.
CO-4.	Get complete understanding about cellular networks and mobile adhoc networks.
CO-5.	Adapt TCP/IP extensions in mobile and cellular technology.

M.Sc. (Information Technology)

SEMESTER-II

MIT-422
Option (i)
Distributed Databases

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (per week):4 **Theory Marks: 75**
Total Hours:60 **Theory Internal Assessment M: 25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

Course Objectives:

1.	To get acquaint students with the basics of Distributed DBMS, different Architectural Models for DDBMS, Data allocation, Relational Database Design, Information Requirements for Data allocation, Query Processing & Optimization in context of distributed databases.
2.	To get acquaint students with good knowledge of Distributed DBMS. During the course, students will learn about data distribution, data distribution mechanism/ techniques along with its pros/cons.
3.	The key goal is to prepare students for a professional career in the field of data administration and database design.
4.	To get acquaint students with Query Decomposition and Distributed Concurrency Control issues, methods and their merits and demerits.

UNIT -I

Introduction

Concepts, Advantages and Disadvantages of Distributed Database Management System (DDBMS), Homogenous and Heterogeneous DDBMS. Functions of a DDBMS. Distributed Database Management System Architecture

Architectural Models for DDBMS (Distributed Database Management System): Autonomy, Distribution, Heterogeneity factors; Client Server Systems, Peer-to-Peer Distributed Systems, Global Directory Issues.

Distributed Relational Database Design

Fragmentation: Reasons, Alternatives, Degree, Information requirement. Horizontal, Vertical, Hybrid Fragmentation.

UNIT -II

Allocation: Allocation Problem, Information Requirements for allocation.

Distributed Relational Database Query Processing & Optimization

Query Decomposition, Localization of Distributed Data, Query Optimization, Introduction to Distributed Query Optimization Algorithms

Distributed Concurrency Control, Objectives, Distributed Serializability, centralized two phase locking, Distributed two-phase locking.

References:

1. M.TamerOzsu, Patrick Valdureiz, *'Principles of Distributed Database Systems'* Second Edition, Prentice Hall, 2002.
2. RomezElmasri, ShamkantB.Navathe, *'Fundamentals of Database Systems'* Pearson Education, 2005.
3. Silberschatz, Korth, Sudershan "Database System Concepts" 4th Ed. McGraw Hill,2006.
4. Connolly &Begg "Database Systems – A practical approachto design, Implementation and Management, 3rd Ed. Pearson Education, 2005.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Get knowledge & Understanding: Distributed Databases and their design & development
CO-2.	Learn Intellectual Cognitive/ analytical skills: Data Distribution and Allocation strategies
CO-3.	Learn practical Skills: Algorithmic knowledge about distributed database design and allocation.
CO-4.	Learn transferable skills: Usage of DDBMS design and allocation models

M.Sc. (Information Technology)
SEMESTER-II
MIT-422

Option (ii)
Cloud Computing

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (per week):4 **Theory Marks: 75**
Total Hours: 60 **Theory Internal Assessment M: 25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

Course Objectives:

1.	The fundamental ideas behind Cloud Computing, the evolution of the paradigm, its applicability; benefits, as well as current and future challenges.
2.	The basic ideas and principles in data center design; cloud management techniques and cloud software deployment considerations.
3.	Different CPU, memory and I/O virtualization techniques that serve in offering software, computation and storage services on the cloud; Software Defined Networks (SDN) and Software Defined Storage (SDS).

UNIT -I

Introduction: Definition, Vision, Reference Model, Benefits, Limitations, Terminology, Open Challenges.
Virtualization: Definition, Type of Virtualization, Benefits, Limitations, Virtualization and Cloud, Virtual Appliance.
Cloud Computing Architecture: Service Models, Deployment Models, Cloud Entities, Cloud Clients, Service Level Agreement (SLA) and Quality of Service (QoS) in Cloud Computing.

UNIT -II

Programming Models in Cloud: Thread Programming, Task Programming and Map–Reduce Programming.

Cloud Security: Infrastructure Security, Data Security, Identity and Access Management, Privacy Management, Security as a Service on Cloud.
Advance Topic in Cloud: Energy Efficiency in cloud, Market Oriented Cloud Computing, Big–Data Analytics, Federated Cloud Computing.

References:

1. Rajkumar Buyya, Christian Vecchiola and Thamarai Selvi, Mastering Cloud Computing: Foundation and Application Programming, Tata McGraw Hill, ISBN–13: 978–1–25–902995–0, New Delhi, India, Feb 2013.
2. Tim Mather, SubraKumaraswamy, ShahedLatif, Cloud Security and Privacy, O'Reilly,ISBN–13: 978–8–18–404815–5.
3. Barrie Sosinsky, Cloud Computing Bible, Wiley India Pvt. Ltd., ISBN–13: 978–8–12–652980–3, New Delhi, India, 2011.
4. Dr. Saurabh Kumar, Cloud Computing: Insights Into New–Era Infrastructure, Wiley India Pvt. Ltd, ISBN–13: 978–8–12–652883–7, New Delhi, India, 2011.
5. Fern Halper, Hurwitz, Robin Bloor, Marcia Kaufman, Cloud Computing for Dummies, Wiley India Pvt. Ltd, ISBN–13: 978–0–47–059742–2, New Delhi, India, 2011.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Understand the impact of engineering on legal and societal issues involved in addressing the security issues of cloud computing.
CO-2.	Apply and design suitable Virtualization concept, Cloud Resource Management and design scheduling algorithms.
CO-3.	Create combinatorial auctions for cloud resources and design scheduling algorithms for computing clouds.
CO-4.	Design different workflows according to the requirements and apply map reduce programming model.
CO-5.	Address cloud Storage systems and Cloud security, the risks involved, its impact and develop cloud application.
CO-6.	Analyze the Cloud computing setup along with it's vulnerabilities and applications using different architectures.

M.Sc. (Information Technology)
SEMESTER-II
MIT-423: Image Processing

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (per week):4 **Theory Marks: 75**
Total Hours: 60 **Theory Internal Assessment M: 25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

Course Objectives:

1.	To study the image fundamentals and mathematical transforms necessary for image processing.
2.	To understand the image enhancement techniques
3.	To study image restoration procedures.
4.	To Laern the image compression procedures.
5.	To expose students to current applications in the field of digital image processing.

UNIT -I

Introduction - Definition of Digital Image Processing, The Origins of Digital Image Processing, Examples of Fields that Use Digital Image Processing - X-ray Imaging, Ultraviolet Band, Visible and Infrared Bands, Microwave Band, and Radio Band Imaging; Fundamental Steps in Digital Image Processing, Components of an Image Processing System,

Digital Image Fundamentals -Elements of Visual Perception, Light and the Electromagnetic Spectrum, Image Sensing and Acquisition - Single Sensor, Sensor Strips, Sensor Arrays, A Simple Image Formation Model; Image Sampling and Quantization - Spatial and Gray-Level Resolution, Aliasing and Moiré Patterns, Zooming and Shrinking Digital Images; Some Basic Relationships Between Pixels - Neighbors, Adjacency, Connectivity, Regions, and Boundaries, Distance Measures, Image Operations on a Pixel Basis; Linear and Nonlinear Operations

Image Enhancement in the Spatial Domains - Some Basic Gray Level Transformations - Negatives, Log, Power-Law, Piecewise-Linear Transformations; Histogram Processing - Histogram Equalization, Histogram Matching (Specification), Local Enhancement; Enhancement Using Arithmetic/Logic Operations - Image Subtraction, Image Averaging; Basics of Spatial Filtering, Smoothing Spatial Filters - Smoothing Linear and Order-Statistics Filters; Sharpening Spatial Filters - Use of Second Derivatives for Enhancement : The Laplacian, Use of First Derivatives for Enhancement: The Gradient; Combining Spatial Enhancement Methods

Image Enhancement in the Frequency Domain - Introduction to the Fourier Transform and the Frequency Domain - One-Dimensional Fourier Transform and its Inverse, Two-Dimensional DFT and Its Inverse, Filtering in the Frequency Domain, Correspondence between Filtering in the Spatial and Frequency Domains; Smoothing and Frequency-Domain Filters - Ideal , Butterworth, and Gaussian Lowpass Filters; Sharpening Frequency Domain Filters - Ideal , Butterworth, and Gaussian Highass Filters, Laplacian in the Frequency Domain, Unsharp Masking, High-Boost Filtering, and High-Frequency Emphasis Filtering; Homomorphic Filtering Implementation - Some Additional Properties of the 2-D Fourier Transform, Computing the Inverse Fourier Transform Using a Forward Transform Algorithm, More on periodicity: the Need for Padding, The Convolution and Correlation Theorems, Summary of Properties of the 2-D Fourier Transform, The Fast Fourier Transform;

UNIT -II

Image Restoration - A Model of the Image Degradation/Restoration Process, Noise Models, Restoration in the Presence of Noise Only – Spatial Filtering - Mean, Order-Statistics, and Adaptive Filters Filters; Periodic Noise Reduction by Frequency Domain Filtering - Bandreject, Bandpass, and Notch Filters Filters; Estimating the Degradation Function - Estimation by Image Observation, Experimentation and Modeling; Inverse Filtering, Minimum Mean Square Error (Wiener) Filtering, Geometric Mean Filter - Geometric Transformations, Spatial Transformations, Gray-Level Interpolation

Color Image Processing - Color Fundamentals, Color Models - RGB, CMY, HSI; Pseudocolor Image Processing - Intensity Slicing, Gray Level to Color Transformations; Basics of Full-Color Image Processing, ColorTransformations - Formulation, Color Complements, Color Slicing, Tone and Color Corrections, Histogram Processing; Smoothing and Sharpening, Color Segmentation, Color Edge Detection, Noise in Color Images

Morphological Image Processing - Some Basic Concepts from Set Theory, Logic Operations Involving Binary Images, Dilation and Erosion, Opening and Closing, The Hit-or-Miss Transformation, Some Basic Morphological Algorithms - Boundary Extraction, Region Filling, Extraction of Connected Components, Convex Hull, Thinning, Thickening; Extensions to Gray-Scale Images

Image Segmentation -Detection of Discontinuities - Point Detection, Line Detection, Edge Detection, Edge Linking and Boundary Detection - Local Processing, Global Processing via the Hough Transform, Thresholding - The Role of Illumination, Basic Global Thresholding, Basic Adaptive Thresholding, Optimal Global and Adaptive Thresholding, Use of Boundary Characteristics for Histogram Improvement and Local Thresholding, Thresholds Based on Several Variables, Region-Based Segmentation - Region Growing, Region Splitting and Merging.

References:

1. Digital Image Processing by Gonzalez & Wood, Addison Wesley,
2. Rosenfield, A and Kak, A.C., Picture processing, Academic PressN.Y., 1982.
3. Jain, A.K., Fundamentals of Digital Image Processing, Englewood Cliffs, Prentice Hall, 1989.
4. Chris Soloman, Stuart Gibson, Fundamentals of Digital Image Processing: A Practical Approach using MatLab, John Wiley and Sons, 2007.
5. Pratt, W.K. Digital Image Processing, John Wiley, N.Y./1978.
6. Solomon Chris , Toby Breckon Fundamentals of Digital Image Processing :A Practical Approach with Examples in Matlab

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Review the fundamental concepts of a digital image processing system.
CO-2.	Analyse images in the frequency domain using various transforms.
CO-3.	Evaluate the techniques for image enhancement and image restoration.
CO-4.	Categorize various compression techniques.
CO-5.	Interpret image segmentation and representation techniques.

M.Sc. (Information Technology)
SEMESTER-II

MIT-424: Fuzzy Systems

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (per week):4 **Theory Marks: 75**
Total Hours: 60 **Theory Internal Assessment M: 25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

Course Objectives:

The objective of this course is:

1.	To provide in depth knowledge on the latest subject and their applications in different fields.
2.	To introduce the various learning rules of Neural Networks both supervised and unsupervised.
3.	To explain the working of error back propagation training algorithm and its use as a mathematical tool for solving problems.
4.	To provide knowledge on associative memories and their applications.
5.	To introduce Fuzzy Logic, Fuzzy relations and Fuzzy mathematics.
6.	To explain the concept of Fuzzy control and also help to design FLC.
7.	➢ To explain few applications of both Neural Networks and Fuzzy Logic in different fields Reasoning. ➢ To provide in depth knowledge on the subject and their applications in different fields ➢ To introduce Fuzzy Logic, Fuzzy Sets, Fuzzy relations and Fuzzy mathematics. ➢ To introduce the concept of Fuzzification & Defuzzification. ➢ To explain the concept of Fuzzy control and also help to design FLC. ➢ To make able the students to take decisions with Fuzzy information. ➢ To explain few applications of Genetic Algorithms, Neural Networks & Inductive

UNIT -I

Introduction: The Case for Imprecision, A Historical Perspective, The Utility of Fuzzy Systems, Limitations of Fuzzy Systems

The Illusion: Ignoring Uncertainty and Accuracy, Uncertainty and Information, The Unknown, Fuzzy Sets and Membership, Chance Versus Fuzziness

Classical Sets and Fuzzy Sets: Classical Sets: Operations on Classical Sets, Properties of Classical (Crisp) Sets, Mapping of Classical Sets to Functions, Fuzzy Sets: Fuzzy Set Operations, Properties of Fuzzy Sets, Alternative Fuzzy Set Operations

Classical Relations and Fuzzy Relations: Cartesian Product, Crisp Relations: Cardinality of Crisp Relations, Operations on Crisp Relations, Properties of Crisp Relations, Composition, Fuzzy Relations: Cardinality of Fuzzy Relations, Operations on Fuzzy Relations, Properties of Fuzzy Relations, Fuzzy Cartesian Product and Composition, Tolerance and Equivalence Relations: Crisp Equivalence Relation, Crisp Tolerance Relation, Fuzzy Tolerance and Equivalence Relations: Value Assignments, Max–Min Method

Properties of Membership Functions, Fuzzification and DeFuzzification:Features of the Membership Function, Various Forms, Fuzzification, Defuzzification to Crisp Sets, λ-Cuts for Fuzzy Relations, Defuzzification to Scalars

UNIT -II

Logic and Fuzzy Systems: Part I Logic: Classical Logic, Fuzzy Logic, Approximate Reasoning, Other Forms of the Implication Operation

Fuzzy Systems: Natural Language, Linguistic Hedges, Fuzzy (Rule-Based) Systems, Graphical Techniques of Inference

Development of Membership Functions: Membership Value Assignments: Intuition, Inference, Rank Ordering, Neural Networks, Genetic Algorithms, Inductive Reasoning

Decision Making with Fuzzy Information: Fuzzy Synthetic Evaluation, Fuzzy Ordering, Non-transitive Ranking, Preference and Consensus, Multiobjective Decision Making

Fuzzy Classification: Classification by Equivalence Relations, Crisp Relations, Fuzzy Relations, Cluster Analysis, Cluster Validity, *c*-Means Clustering, Fuzzy *c*-Means (FCM), Fuzzy *c*-Means Algorithm

Introduction to MATLAB: Fuzzy Logic Toolbox, Fuzzy Logic Simulink Demos.

MATLAB simulation: Fuzzy Logic Controller (FLC) implementation. Simulink Fuzzy Logic Controller (FLC) implementation. Applications of FLC to Control System. Develop Fuzzy Inference System for various applications.

References:

1. Fuzzy Logic wit Engineering Applications by Timothy J. Ross, Wiley, Third Edition
2. Fuzzy logic intelligence, Control and Information by John Yen and Reza Langari, Pearson Education, 2003.
3. Uncertain Rule-based Fuzzy Logic System: Introduction and New Directions by Jerry M. Mendel, PrenticeHall.

4. Fuzzy Sets, Fuzzy Logic and Fuzzy System – edited by George J. Keir& Bo Yuan 1996. World Scientific Press.
5. Fuzzy Set Theory: Foundations and Applications by George J. Klir, Ute. St. Clair, Bo Yuan, Prentice Hall,1997.
6. Getting Started with MATLAB: A Quick Introduction for Scientists and Engineers by RudraPratap, Oxford University Press, 2010.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Study basic and advanced differences between Classical Sets versus Fuzzy sets, Classical Relations versus Fuzzy relations.
CO-2.	Design Membership functions.
CO-3.	Analyse Fuzzy rule-based systems, Graphical techniques of inference and develop these membership functions.
CO-4.	Apply decision making techniques with fuzzy information like fuzzy rank ordering, Preference & consensus or Fuzzy c means clustering etc.

M.Sc. (Information Technology)

SEMESTER-II

MIT-425: Network Design and Performance Analysis

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (per week):4 **Theory Marks: 75**
Total Hours: 60 **Theory Internal Assessment M: 25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

Course Objectives:

1.	Understand that global connectivity can be achieved through computer networks.
2.	Understand the function of networks and get exposure to different existing and upcoming communication technologies.
3.	Make them aware that knowledge about hardware and software requirements of networks is essential.
4.	Understanding the requirements, planning and choosing the technology for building a network.
5.	Providing the knowledge about network design, security and tuning the network.

UNIT -I

Requirements, planning, & choosing technology: Business requirements, technical requirement user requirements, traffic sizing characteristics time & delay consideration.
Traffic engineering and capacity planning: Throughput calculation traffic characteristics &source models, traditional traffic engineering, queued data & packet switched traffic modeling, designing for peaks, delay or latency

Network performance modeling- creating traffic matrix, design tools, components of design tools, types of design projects.
Technology Comparisons- Generic packet switching networks characteristics, private vs. public networking, Business aspects of packet, frame and cell switching services, High speed LAN protocols comparison, Application performance needs, Throughput, burstiness, response time and delay tolerance, selecting service provider, vendor, service levels etc.

UNIT -II

Access Network Design- N/W design layers, Access N/W design, access n/w capacity, Backbone n/w design, Backbone segments, backbone capacity, topologies, Tuning thenetwork, securing the network,
Design for network security.
Network Optimization: Network optimization theory: Goals of network optimization, measurements for network optimization, optimization tools, optimization techniques.

References:

1. James D McCabe, Network Analysis, Architecture and Design, 2nd Edition, MorganKaufman Series in Networking, 2007.
2. Youeu Zheng, Shakil Akhtar, Network for Computer Scientists and Engineers, OxfordUniversity Press, 2007.
3. Foruzan, Data Communications & Networking, Tata –Mcgraw Gill, 2006.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Become familiar with the concept of Network hardware and software requirements.
CO-2.	Understand the different protocols working at different layers of OSI and TCP/IP models.
CO-3.	Learn the concepts of different networking devices like router, hub, switch.
CO-4.	Understanding the concept of traffic engineering and capacity planning.
CO-5.	Learn the concepts of switching and network performance modeling.
CO-6.	Comparing the private and the public networking.
CO-7.	Understanding the network design and network security.
CO-8.	Learning the concept of Network optimization.

M.Sc. (Information Technology)
SEMESTER-II

MIT-426P
Programming Laboratory-II

Time: 3 Hrs **Total Marks: 100**
Credit Hours (Per Week): **Practical Marks: 75**
Practical Internal Assessment M: 25

Course Objectives:
The objectives of this course is:

1.	To provide in depth knowledge on the latest subject and their applications in different fields.
2.	To introduce the various learning rules of Neural Networks both supervised and unsupervised.
3.	To explain the working of error back propagation training algorithm and its use as a mathematical tool for solving problems.
4.	To provide knowledge on associative memories and their applications.
5.	To introduce Fuzzy Logic, Fuzzy relations and Fuzzy mathematics.
6.	To explain the concept of Fuzzy control and also help to design FLC.
7.	To explain few applications of both Neural Networks and Fuzzy Logic in different fields ➢ To provide practical knowledge on the subject and their applications in different ➢ fields ➢ To implement Fuzzy Logic, Fuzzy Sets, Fuzzy relations in MATLAB. ➢ To explain the concept of Fuzzy control and also help to design FLC. ➢ To implement few applications of Genetic Algorithms, Neural Networks & ➢ Inductive Reasoning. ➢ Practical Knowledge of Using MATLAB.

Programming Laboratory based on Image Processing or Fuzzy Systems or Mobile Computing.

Course Outcomes:
On Completing the course, the students will be able to:

CO-1.	Understand the basic Use of MATLAB.
CO-2.	Study the applications of Major Concepts used in Fuzzy in MATLAB.
CO-3.	Understand the implementation of Fuzzy Logic Controller (FLC).

M.Sc. (Information Technology)
Semester III

Sr. No.	Course Code	Course Name	Marks				Page No.
			Theory	Internal Assessment	Practical	Total	
1	MIT-531	Network Protocols	75	25	-	100	85-87
2	MIT-532	Advanced Web Technologies using ASP.NET	75	25	-	100	88-89
3	MIT-533	Linux Administration	75	25	-	100	90-91
4	MIT-534	System Simulation	75	25	-	100	92-93
5	MIT-535	Microprocessor and its Applications	75	25	-	100	94-95
6	MIT-536P	Programming Laboratory-III(Based on Advanced Web Technologies using ASP.NET)	-	25	75	100	96
					Total Marks	**600**	

M.Sc. (Information Technology)
SEMESTER-III

MIT-531: Network Protocols

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (Per Week): 4 **Theory Marks: 75**
Total Hours: 60 **Theory Internal Assessment M: 25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

Course Objectives:

1.	The goal of this course is to familiarize students with the concepts of network protocols, data communication and Internetworking.
2.	To understand the principles of computer networking, including protocol features, protocol layering, and addressing, routing, and basic network security issues.
3.	Students will be able to enumerate the architectural structures of the ISO/OSI and TCP/IP and explain functions of each layer.

UNIT-I

Review of Basic Concepts: TCP/IP Protocol Suite, Underlying Technologies: LAN (802.3), Wireless Lans (802.11) , Point-to-point WANS, Switched WANS, Protocols , Standards, Standards Organizations: Internet Standards, Internet Administration, IEEE Standards ,Frame Format, Addressing, Ethernet Evolution, Standard Ethernet, Fast Ethernet, Gigabit Ethernet, Ten-Gigabit Ethernet

IPv4 Addresses: Address Space, Notation, Range of Addresses, Operations, CLASSFUL ADDRESSING: Classes, Classes and Blocks, Two-Level Addressing, Three-Level Addressing: (Subnetting & Supernetting), CLASSLESS ADDRESSING: Variable-Length Blocks, Two-Level Addressing-(Block Allocation, Subnetting), SPECIAL ADDRESSES: Special Blocks, Special Addresses in Each block, NAT -Address Translation, Translation Table

Delivery and Forwarding of IP Packets: DELIVERY: Direct Delivery & Indirect Delivery, FORWARDING: Forwarding Based on Destination Address, Forwarding Based on Label

Internet Protocol Version IPv4: DATAGRAMS, FRAGMENTATION: Maximum Transfer Unit, Fields Related to Fragmentation, OPTIONS: Format, Option Types, CHECKSUM: Checksum Calculation at the Sender, Checksum Calculation at the Receiver, Checksum in the IP Packet, IP PACKAGE

Address Resolution Protocol (ARP): ADDRESS MAPPING: Static Mapping, Dynamic Mapping, THE ARP PROTOCOL: Packet Format, Encapsulation, Operation, Proxy ARP, ARP PACKAGE, Reverse address resolution protocol, Primary and backup RARP servers.

Internet Control Message Protocol Version: MESSAGES: Message Format, Error Reporting Messages, Query Messages, Checksum, DEBUGGING TOOLS, Ping, Traceroute, ICMP PACKAGE: Input Module, Output Module

UNIT-II

Routing Protocols (RIP, OSPF, and BGP) : Introduction: Cost or Metric, Static versus Dynamic Routing Tables, Routing Protocol: INTRA- AND INTER-DOMAIN ROUTING, DISTANCE VECTOR ROUTING-(Bellman-Ford Algorithm, Distance Vector Routing Algorithm, Count to Infinity, RIP ,RIP Message Format, Requests and Responses, Timers in RIP, RIP Version 2, Encapsulation, LINK STATE ROUTING- Building Routing Tables, OSPF, Areas, Metric, Types of Links, Graphical Representation, OSPF Packets, Link State Update Packet, Other Packets, Encapsulation, PATH VECTOR ROUTING: Reachability, Routing Tables, BGP:Types of Autonomous , Systems, Path Attributes, BGP Sessions, External and Internal BGP, Types of Packets, Packet Format, Encapsulation

Transport Layer: TRANSPORT-LAYER SERVICES, Process-to-Process Communication, addressing: Port Numbers, Encapsulation and Decapsulation, Multiplexing and Demultiplexing, Flow Control, Error Control, Combination of Flow and Error Control, Congestion Control, Connectionless and Connection-Oriented Services

Transport-layer protocols: Simple Protocol, Stop-and-Wait Protocol, Go-Back-*N* Protocol, Selective-Repeat Protocol, Bidirectional Protocols: Piggybacking

User Datagram Protocol: User Datagram, UDP Services, Process-to-Process Communication, Connectionless Services, Congestion Control, Encapsulation and Decapsulation, Queuing, Multiplexing and Demultiplexing, Comparison between UDP and Generic Simple Protocol, UDP APPLICATIONS:UDP Features, Typical Applications, UDP PACKAGE: Control-Block Table, Input Queues, Control-Block Module, Input Module, Output Module, Examples

Transmission Control Protocol: TCP SERVICES: Process-to-Process Communication, Stream Delivery Service, Full-Duplex Communication, Multiplexing and Demultiplexing, Connection-Oriented Service, Reliable Service, TCP FEATURES: Numbering System, Flow Control, Error Control, Congestion Control, SEGMENT, Format, Encapsulation, A TCP CONNECTION: Connection Establishment, Data Transfer, Connection Termination, Connection Reset, STATE TRANSITION DIAGRAM ,Scenarios, TCP implementation issues.

References:

1. Douglas E.Comer, Internetworking with TCP/IP: Principles, Protocols
2. Forouzan, TCP-IP, Protocol Suit, TMH.
3. Comer, Internetworking with TCP-IP, Vol. 3.
4. Unix Network Programming, W. Richard Stevens.
5. SNMP, Stallings, Pearson.
6. TCP-IP Network Administration, Hunt Craig.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Define network protocol structures and functions
CO-2.	Explain the structures and functions of data link and MAC layers
CO-3.	Discuss the network layer concept and local area network (LN) design
CO-4.	Express the working principles of transport layer protocols (TCP and UDP)

M.Sc. (Information Technology)
SEMESTER-III

MIT-532: Advanced Web Technologies using ASP.NET

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (per week):4 **Theory Marks: 75**
Total Hours: 60 **Theory Internal Assessment M: 25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

Course Objectives:

1.	The students will Study the architecture of Dot Net framework
2.	Understand the basic principles of website development using IDE
3.	Learn advanced windows and web development techniques using dot NET

UNIT-I

Introduction to .Net Framework
Developing console applications, C# Type Conversion Methods, boxing and unboxing, compiling & building projects, using command line argument, compiling a C# program using command Line utility CSC.EXE
Introduction to Web Applications:
Standard Controls: Display information, accepting user input, submitting form data, displaying images, Using the panel control, Using the hyperlink control.
Validation Controls: Using the required field validator control, Using the range validator control using the compare validator control, Using the regular expression validator control, Using the custom validator control, Using the validation summary controls.
Rich Controls: Accepting file uploads, displaying a calendar, displaying advertisement, displaying different page views, Displaying a wizard.

Designing Website with Master Pages: Creating master pages, modifying master page content, Loading master page dynamically.

SQL Data Source Control: Creating database connections, executing database commands, Using ASP.NET parameters with the SQL data source controls, programmatically executing SQL data source commands, Caching database data with the SQL data Source controls.

UNIT-II

List Controls: Dropdown list control, Radio button list controls, list box controls, bulleted list controls, custom list controls.

Grid View Controls: Grid view control fundamentals, using field with the grid view control, working with grid view control events extending the grid view control.

Building Data Access Components with ADO.NET: Connected the data access, Disconnected data access, executing a synchronous database commands, Building data base objects with the .NET framework.

Maintaining Application State: Using browser cookies, using session state, Using profiles.

Caching Application Pages and Data: page output caching, partial page caching, data source caching, data caching, SQL cache dependences.

References:

1. ASP.NET 3.5: Stephen Walther, Pearson Education, 2005
2. ASP.NET 4.0: In Simple Steps by Kogent Learning Solutions Inc.
3. ASP.NET 4.5: Black Book by Kogent Learning Solution Inc
4. ASP.NET: The Complete Reference Book by Matthew Macdonald ,McGraw Hill education

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Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Evaluate C# and the .NET framework namespace contents.
CO-2.	Develop the console and GUI applications using C# .Net.
CO-3.	Set up various navigation techniques for integrating web pages within the site.
CO-4.	Create the dynamic web page using ASP.NET Controls which interact with databases.
CO-5.	Manage cookies and sessions as state management techniques.

M.Sc. (Information Technology)

SEMESTER-III

MIT-533: Linux Administration

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (Per Week): **Theory Marks: 75**
Theory Internal Assessment M: 25

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

Course Objectives:

The objectives of this course is to:

1.	Learn installation of Linux OS software packages and command line installation.
2.	Understand how to manage file systems and administering a Linux system.
3.	Learn Setting up LAN and Setting up DHCP & NIS.
4.	Know about Setting up Print Server, File Server and Web Server.
5.	Learn Troubleshooting system problems.

UNIT-I

Introduction: Introduction to LINUX, Installing LINUX, Partitions, LILO, Installing software packages. Updating with Gnome, updating with KDE, Command line installing.
File Structure: LINUX files, File structure, File & Directory permission, Operations on a file.
Administering Linux: Creating a user A/C, modifying a user A/C, deleting a user A/C, Checking Disk Quotas, System Initialization, System start-up & shutdown, Installing & managing H/W devices.
Setting Up A LAN: Understanding LAN, setting up Wireless LAN, Understanding IP address, Troubleshooting LAN.

UNIT-II

Setting Up Print Server: Choosing CUPS, Working with CUPS Printing, Managing Printing, Configuring Print Server.
Setting Up File Server: Setting up an NFS, SAMBA, Installing & Running send mail.
Troubleshooting: Troubleshooting LINUX in GRUB mode.
Setting Up Web Server: Configuring the Apache Server, Starting & stopping the server, Monitoring Server Activities.
Setting Up DHCP & NIS: Setting up DHCP Server, setting up DHCP Client, Setting up Network Information Service.

References:

1. Redhat Linux (10) Bible: Christopher Negus, 2003
2. Linux Unleashed: Tim Parker, 2006
3. Linux Administration Tools: Charles Fisher, 2007
4. Linux: The Complete Reference, Sixth Edition by Richard Petersen
5. Linux Administration: A Beginners Guide Sixth Edition by Wale Soyinka

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Make appropriate decisions during the configuration process to create a properly functioning Linux environment.
CO-2.	Use programs and utilities to administer a Linux machine.
CO-3.	Explain how a Linux server can be integrated within a multi-platform environment.
CO-4.	Analyse the need for security measures for a Linux environment.
CO-5.	Identify the different uses and advantages of Linux in a business environment in order to participate in discussions regarding network servers and services.

M.Sc. (Information Technology)
SEMESTER-III

MIT-534: System Simulation

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (Per Week): 4 **Theory Marks: 75**
Total Hours: 60 **Theory Internal Assessment M: 25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

Course Objectives:

1.	Demonstrate basic programming skills.
2.	Learn the role of modelling.
3.	One can construct difference-based computer model.

UNIT-I

Introduction : Concept of a system, stochastic activities, continue and discrete system, system modeling, mathematical modelling, principle used in modeling.

Simulation of Systems: Concepts of simulation of continuous systems with the help of two examples; use of integration formulas; concepts of discrete system simulation with the help of two examples, Generation of random numbers, Generation of non- uniformly distributed numbers.

Simulation of Queuing Systems: Rudiments of queuing theory, Simulation of Single-Server queue, two-server queue, general queues.

UNIT-II

Simulation in Inventory Control and Forecasting: Elements of inventory theory, inventory models, Generation of Poisson and Erlang variats, forecasting and regression analysis.

Design and Evaluation of Simulation Experiments: Experimental layout and validation.

Simulation Languages : Continuous and discrete simulation languages, Block-Structured continuous simulation languages, expression based languages, discrete system simulation languages, simscript, GPSS, SIMULA, Simpack, GASP IV, CSIM, factors in selection of a discrete system simulation languages.

Case Studies: Analytic Vs Simulation Models, Applications to Operating Systems, Databases, Computer Networks Architectures.

References:

1.Narsingh Deo, "System Simulation with Digital Computer", Prentice-Hall of India Pvt. Ltd. - 1993.
2. Gordon, "System Simulation", Prentice Hall of India Pvt. Ltd. – 1993

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Analyse modelling and simulation.
CO-2.	Explain and conduct the transforming of continues function and dynamic equation into discrete computer representation.
CO-3.	Develop simulation model using heuristic methods.
CO-4.	Analysis of Simulation models using input analyser, and output analyser
CO-5.	Explain Verification and Validation of simulation model.

M.Sc. (Information Technology)
SEMESTER-III

MIT-535: Microprocessor and its Applications

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (per week):4 **Theory Marks: 75**
Total Hours: 60 **Theory Internal Assessment M: 25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

Course Objectives:

1.	The student will be able to understand the future trends in microprocessor.
2.	Students can understand detailed software and hardware architecture of microprocessor.
3.	The student can analyse how different peripherals are interfaced with microprocessor.

UNIT-I

Introduction: Introduction to Microprocessor, General Architecture of Microcomputer System. Microprocessor Units, Input unit, Output unit, Memory unit and auxiliary storage unit.

Architecture of 8086/8088 Microprocessor: Description of various pins, configuring the 8086/8088 microprocessor for minimum and maximum mode systems, Internal architecture of the 8086/8088 microprocessor, system clock, Bus cycle, Instruction execution sequence

Memory Interface of 8086/8088 Microprocessor: Address space and data organization, generating memory addresses hardware organization of memory address space, memory bus status code, memory control signals, read/write bus cycles, program and data storage memory, dynamic RAM system.

UNIT-II

Input/Output Interface of the 8086/8088 Microprocessor: I/O interface, I/O address space and data transfer, I/O instructions, I/O bus cycles, Output ports, 8255A Programmable Peripheral Interface (PPI), Serial communication interface (USART and UART) – the RS- 232 C interface.

Interrupt Interface of 8086/8088 Microprocessor: Types of Interrupt, Interrupt Vector Table (IVT).

Pentium Processor Family: Internal architecture, software architecture of Pentium processor, Real mode & Protected mode Register Sets ,enhancement to instruction set.

References:

1. Walter A. Triebel, Avtar Singh :the 8088 and 8086 microprocessors Fourth Edition
   a. Prentice Hall
2. Barry B. Brey, The Intel Microprocessors: Architecture, Programming, and Interfacing, 8th Edition, June 28, 2008, Prentice Hall.
3. Liu Yu Cheng, Gibson :Microcomputer Systems - The 8086/8088 Family: Architecture, Programming and Design
4. Douglas V. Hall: Microprocessors and Interfacing – Programming and Hardware, Tata McGraw Hill Publishing Company Ltd., New Delhi.
5. Peter Abel: IBM PC Assembly Language and Programming, PHI, Delhi.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Illustrate the architecture of 16 bit 8088 /8086 microprocessor.
CO-2.	Use the various addressing modes and data transfer instructions of the microprocessor
CO-3.	Get prepare students for higher processor architecture and embedded systems
CO-4.	Understand the working of Programmable Peripheral interface.
CO-5.	Get introduce the operations and interfacing techniques of 8088/8086 microprocessor.

M.Sc. (Information Technology)
SEMESTER-III
MIT-536 P
Programming Laboratory-III
(Based on Advanced Web Technologies using ASP.NET)

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (per week): **Practical Marks: 75**
Total Hours: 60 **Practical Internal Assessment M: 25**

Course Objectives:

1.	The students will Study the architecture of Dot Net framework and implement it using C# programming and visual studio.
2.	Understand the basic principles of website development using IDE and implement it.
3.	Learn advanced web development techniques using cookies and session, database connectivity and user profiles.

Programming Laboratory based on Advanced Web Technologies using ASP.NET.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Implement C# and the .NET framework namespace contents.
CO-2.	Develop the console and GUI applications using C# .Net.
CO-3.	Set up various navigation techniques for integrating web pages within the site.
CO-4.	Create the dynamic web page using ASP.NET Controls which interact with databases.
CO-5.	Manage cookies and sessions as state management techniques.

M.Sc. (Information Technology)
Semester IV

Sr. No.	Paper no.	Paper	Marks				Page No.
			Theory	Internal Assessment	Practical	Total	
1	MIT-541	Advanced Java Technology	75	25	-	100	98-99
2	MIT-542	Optional Paper Option (i): Network Security Option (ii): Big Data Analytics Option (iii): Ethical Hacking	75	25	-	100	100-105
3	MIT-543	Artificial Neural Network	75	25	-	100	106-107
4	MIT-544P	Programming Laboratory-IV(Based on Advanced Java Technology)	75	25	-	100	108
5	MIT-545P	Project Work	-	50	150	200	109
					Total Marks	**600**	

M.Sc. (Information Technology)
SEMESTER-IV

MIT-541
Advanced Java Technology

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (per week):4 **Theory Marks: 75**
Total Hours: 60 **Theory Internal Assessment M: 25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

Course Objectives:

At the end of this course, the students will know:

1.	To understand object-oriented programming concepts and apply them in solving problems.
2.	To introduce the major conceptual knowledge of Multithreading, Java I/O Basics, Applets, Event handling, AWT and servlets and demonstrate how they relate to design of programs
3.	To introduce the implementation of packages, inheritance and interfaces.
4.	To introduce the concept of exception handling and multithreading.

UNIT-I

Java I/O: I/O Basics, Streams, reading Console input and writing console output, Print Writer Class, Reading & Writing Files, Byte Streams, Character Streams & Serialization.

Multithreaded Programming: The Java Thread Model, Thread Priorities, Synchronization, Interthread communication, Suspending Resuming and Stopping Threads.

Event Handling: The Delegation Event Model, Event Classes, Event Listener Interfaces.

UNIT-II

Applets: Applet Basics, Applet Architecture, Applet: Display, Repaint, Parameter Passing.

AWT: Window Fundamentals, Working with Frame Windows, Graphics, Color and Fonts.

Servlets: Life Cycle of a Servlet, The Servlet API, Reading Servlet Parameters, Handling HTTP Requests and Responses, Cookies & Session Tracking.

References:

1. The Complete Reference – JAVA 2 by Ptrick Naughton & Herbert Schildt TMH Publications.
2. The Java Tutorial Continued by Compione, Walrath, Huml SUN JAVA Tutorial Team, Addison Wessley,2007.
3. Java2 Black Book Steven Holzner OT Dreamtech Press, www.idgbooksindia.com, 2007.
4. "Introduction to Java Programming", Y. Daniel Mliang, Pearsons Publications.
5. Programming with JAVA - E Balgurusamy
6. JAVA: How to Programme- Paul Deital and Harvey Deital

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Understand ability of the concept of OOPs as well as the purpose and uses principles of inheritance, polymorphism, encapsulation and method overloading in core java and as well all the advanced concepts like Multithreading, Applets, Servlets, AWT and I/O Basics in advanced java.
CO-2.	Create a java applications and programs using sound oops practices.
CO-3.	Develop programs using the java collection API as well as the java standard class library.
CO-4.	Develop ability of applying the conceptual approach of working with graphics
CO-5.	Develop and understand the concept of web applications through Applets & Servlets programming.

M.Sc. (Information Technology)
SEMESTER-IV
MIT-542
Option (i)
Network Security

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (per week):4 **Theory Marks: 75**
Total Hours: 60 **Theory Internal Assessment M: 25**
Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

Course Objectives:

1.	Understand principles of network security and to guarantee a secure network by monitoring and analyzing the nature of attacks through various tools.
2.	Exhibit knowledge to secure corrupted systems, protect personal data, and secure computer networks in an organization

UNIT-I

Essential of Network Perimeter Security: Terms. Defense in depth

Packet Filtering: TCP/IP Primer, How Packet filtering Works, TCP And UDP Ports, TCP's Three way handshake, The Cisco Router as a packets filter, An Alternative packet filter: IP Chains, The Cisco ACL, Effective Users of Packets-filtering devices, Tracking Rejected Traffic, Problem with Packets Filters, Dynamic packet Filtering and be Reflexive.

Stateful Firewalls: How a Stateful Firewall works, The concept of state ,Stateful Filtering and stateful Inspection.

Proxy Firewalls: Fundamentals of Proxying, Pros And Cons of Proxy Firewalls, Types of Proxies, Tools of Proxying.

UNIT-II

Security Policy: Firewalls Are Policy, How to develop Policy, Perimeter Consideration.

Network Instruction Detection: Network instruction detection basics, The roles of Network IDS in a parameter defense, IDS Sensor placement, Using an IDS Management Networks.

The Need for Host Hardening: Removing or Disabling of Unnecessary Programs. Limiting access to data and Configuration Files, Controlling User and Privileges, Maintaining Host Security Logs, Applying Patches, additional Hardening Guidelines.

Host Defenses : Hosts and the perimeter, Antivirus Software, Host-Based Firewalls, Host – based Instruction detection, Challenges Of host defenses components.

Instruction Prevention System: What is IPS, IPS Limitation, NIPS, Host-Based Instruction Prevention System, Monitoring file Integrity, Monitoring Application Behaviour.

Fundamentals of Secure Premier Design: Gathering Design Requirements, Design Elements for Premier Security.

Separation Resources: Security Zones, Common Design Elements, VLAN-Based Separation.

References:

1. Roberta Bragg, "Network Security: The Complete Reference", 2017

2. J. Michael Stewart, Network Security, Firewalls And VPNs, 2nd edition

3. Charlie Kaufman, "Network Security: Private Communication in a Public World", Pearson, 2nd edition, 2016.

4. David Kim and Michael G. Solomon, "Fundamentals Of Information Systems Security", 2nd edition, 2013

Course Outcomes:

On Completing the course, the students will be able to:	
CO-1.	Understand the basics of Network Security.
CO-2.	Understand the concept of packet filtering and how to secure a message over insecure channel by various means
CO-3.	Understand various Security zones
CO-4.	Identify the function and types of a firewall, and how does it keep a computer secure and safe from viruses
CO-5.	Understand the implementation of IDS and IPS, Security policies, host Hardening and Host defence.

M.Sc. (Information Technology)
SEMESTER-IV

MCS-542
Option (ii)
Big Data Analytics

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (per week):4 **Theory Marks: 75**
Total Hours: 60 **Theory Internal Assessment M: 25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

COURSE OBJECTIVES

The objective of this course is to:

1.	Study the basic technologies that forms the foundations of Big Data.
2.	Study the programming aspects of cloud computing with a view to rapid prototyping of complex applications.
3.	Understand the specialized aspects of big data including big data application, and big data analytics on Structured, Unstructured Data.
4.	Study different types Case studies on the current research and applications of the Hadoop and big data in industry.

UNIT-I

An Overview of Big Data and Big Data Analytics. Understanding Hadoop Ecosystem (Hadoop Distributed File System, MapReduce, Hadoop YARN, HBase, Combining HBase and HDFS, Hive, Pig, Sqoop, ZooKeeper, Flume, Oozie). MapReduce Framework, Techniques to Optimize MapReduce Jobs, Role of HBase in Big Data Processing

Developing Simple MapReduce Application, Points to Consider while Designing MapReduce. Controlling MapReduce Execution with InputFormat, Reading Data with Custom RecordReader, Organizing Output Data with OutputFormats, Customizing Data with Record Writer, Optimizing MapReduce Execution with Combiner, Controlling Reducer Execution with Partitioners.

UNIT-II

YARN Architecture, Working of YARN, YARN Schedulers, Backward Compatibility withYARN, YARN Configurations, YARN Commands, YARN Containers. Introduction to NoSQL. Types of NoSQL Data Models, Schema-Less Databases, Materialized Views, Distribution Models.

Analytical Approaches, Introducing to various Analytical Tools, Installing R, Handling Basic Expressions in R, Variables in R, Working with Vectors, Storing and Calculating Values in R, Creating and Using Objects, Interacting with Users, Handling Data in R Workspace, Executing Scripts, Reading Datasets and Exporting Data from R, Manipulating and Processing Data in R, Working with Functions and Packages in R, Performing Graphical Analysis in R, Techniques Used for Visual Data Representation, Types of Data Visualization

References:

1. Big Data, Black Book by DT Editorial Services, Dreamtech Press.
2. Big Data Computing and Communications edited by Yu Wang, Hui Xiong, Shlomo Argamon, XiangYang Li, JianZhong Li Springer
3. Big Data Analytics Beyond Hadoop by Vijay Srinivas Agneeswaran, FT Press.

Course Outcomes:

At the end of this course the student shall be able to:

CO-1.	Identify Big Data and its business implications and the working of R language.
CO-2.	Learn HDFS concepts and Interfacing with HDFS
CO-3.	List the components of Hadoop and Hadoop Eco-System.
CO-4.	Access and Process Data on Distributed File System
CO-5.	Manage Job Execution in Hadoop environment and develop Big Data solutions using Hadoop eco system.

M.Sc. (Information Technology)
SEMESTER-IV

MIT-542
Options (iii)
Ethical Hacking

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (per week):4 **Theory Marks: 75 Total**
Hours: 60 **Theory Internal Assessment M: 25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

Course Objectives:

1.	Introduces the ethical hacking methodologies.
2.	Covers applying cyber security concepts to discover and report vulnerabilities in a network.
3.	Explores legal and ethical issues associated with ethical hacking.

UNIT-I

Introduction:
Network Security, Functionality and ease of use Triangle, Essential Terminology and Elements of Security (Threat, Attack, Vulnerabilities, Target of Evaluation, Exploit), Concept of ethical hacking Phases involved in hacking,
Penetration Testing and Ethical Hacking
Foot Printing Introduction to foot printing, Information gathering methodology of the hackers, Active and passive reconnaissance

Scanning
Scanning, Elaboration phase, active scanning. Enumeration, DNS Zone transfer. Detecting live systems on the target network, Discovering services running /listening on target systems,

Understanding port scanning techniques, Identifying TCP and UDP services running on the target network, Understanding active and passive fingerprinting

UNIT-II

System Hacking

Aspect of remote password guessing, Role of eavesdropping ,Various methods of password cracking, Key(stroke) Loggers, Understanding Sniffers and their working, Comprehending Active and Passive Sniffing, Man-in-the-Middle Attacks, ARP Spoofing/Poisoning and Redirection, DNS and IP Sniffing, HTTPS Sniffing.

Trojans and backdoors: Trojan, Overt and Covert Channels, Working of Trojans, Different Types of Trojans, Different ways of Trojan's entry into a system, Indications of a Trojan Attack

Session Hijacking Understanding Session Hijacking, Spoofing vs. hijacking, Phases involved in Session Hijacking, Types of Session Hijacking, Session hijacking Tools.

Hacking Wireless Networks Introduction to 802.11, Role of WEP, Cracking WEP Keys, Sniffing Traffic, Wireless DOS attacks, WLAN Scanners, WLAN Sniffers, Hacking Tools, Securing Wireless Networks.

References:

1. Network Security and Ethical Hacking, RajatKhare, Luniver Press, 30-Nov-2006.
2. Ethical Hacking, Thomas Mathew, OSB Publisher, 28-Nov-2003.
3. Hacking Exposed: Network Security Secrets & Solutions, Stuart McClure, Joel Scambray and George Kurtz, McGraw-Hill, 2005.
4. Ethical Hacking and Network defense, Simpson, Cengage Learning, 2009. 5. Hackers Beware, Eric Core, EC-Council Press, 2003

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Plan a vulnerability assessment and penetration test for a network.
CO-2.	Execute a penetration test using standard hacking tools in an ethical manner.
CO-3.	Report on the strengths and vulnerabilities of the tested network.
CO-4.	Identify legal and ethical issues related to vulnerability and penetration testing.

M.Sc. (Information Technology)
SEMESTER-IV

MIT-543
Artificial Neural Networks

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (per week):4 **Theory Marks: 75**
Total Hours: 60 **Theory Internal Assessment M: 25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

Course Objectives:

1.	Enable students to understand important concepts and theories of artificial neural networks (ANNs)
2.	Enable students to understand how ANN can be designed and trained
3.	Enable students to calculate simple examples of ANNs.
4.	Give students an appreciation of some of the limitations and possibilities of ANNs.

UNIT-I

Neural Network Technology: Evolution of ANN, Architecture of ANN, Knowledge representation.

Neural Network Learning: Basic learning rules, supervised by unsupervised learning, Method of steepest Descent, LMS Algorithm.

Single Layer Perceptrons-I: Preceptron Model, Preceptron learning algorithms: Simple learning algorithm.

UNIT-II

Single Layer Perceptrons-I :Pocket algorithm without and with Ratches, Linear Machines, Kessler's construction, Linear Machines Learning algorithm, Representing Boolean functions.

Single Layer Perceptrons-II :Anderson's BSB Model, Hopfied's Model, K-Means Clustering, Topology-Preserving Maps, ART1 and ART2.

Multilayer Preceptrons : Back-Propagation, Applications of Back-propagation : NETtalk, Handwritten Character Recognition, Pattern Recognition.

References:

1. [SG] Gallant S.L., Neural Networks Learning & Expert Systems, MIT Press, 1993.
2. [SH] Haykin S., Neural Networks : A Comprehensive Foundation, Pearson Education Inc.,Second Edition, 2003.
3.[FS] Freeman J.A., Skapura D.M., Neural Network Algorithms, Applications and Programming Techniques, Addison-Wesley Publications, 1992.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Describe various types of ANNs
CO-2.	Explain how ANNs can be trained.
CO-3.	Carry out simple simulations of ANNs.
CO-4.	Understand how ANNs can be design

M.Sc. (Information Technology)
SEMESTER-IV

MIT-544 P
Programming Laboratory-IV
(Based on Advanced Java Technology)

Time: 3 Hrs. **, Total Marks: 100**
Credit Hours (per week):4 **Practical Marks: 75**
Total Hours: 60 **Practical Internal Assessment M: 25**

Course Objectives:

1.	To introduce the object-oriented programming concepts.
2.	To understand object-oriented programming concepts and apply them in solving problems.
3.	To introduce the principals of inheritance and polymorphism and demonstrate how they relate to design of abstract class.
4.	To introduce the implementation of packages and interfaces.
5.	To introduce the concept of exception handling and multithreading.

Programming Laboratory based on Advanced Java Technology.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Understand the concept of OOPs as well as the purpose and uses principal of inheritance, polymorphism in encapsulation and method overloading.
CO-2.	Identify classes, objects, members of a class and the relationship among them. needed for a specific problem.
CO-3.	Create a java applications programs using sound oops practices.
CO-4.	Develop programs using the java collection API as well as the java standard class library.
CO-5.	Understand exception handling.

M.Sc. (Information Technology)
SEMESTER-IV

MIT–545 P
Project Work

Time: 3 Hrs. **Total Marks: 200**
Credit Hours (per week):4 **Project Marks: 150**
Total Hours: 60 **Project Internal Assessment M: 50**
Course Objectives:

1.	Develop skills in presentation and discussion of research topics in a public forum.
2.	Exposure to a variety of research projects and activities in order to enrich their academic experience
3.	It makes the student confident in designing an Online Project with advanced technologies on their choice
4.	Students are trained to meet the requirements of the Industry.

The Project is to be prepared based on some current problems from industry / business / academic domain using some currently available technology / platform.

Note:
1. The end semester project work evaluation is to be conducted by following panel of examiners:-
   a. Internal Examiner
   b. External Examiner.
   c. Head/Head's nominee .
2. The Project are to be submitted as per the common ordinances for P.G. courses under semester system.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Carry out time planning for the project.
CO-2.	Follow correct grounding and shielding practices
CO-3.	Do effective trouble-shooting of the mini project.
CO-4.	Demonstrate a through and systematic understanding of project contents.
CO-5.	Understand methodologies and professional way of documentation and communication.
CO-6.	Know the key stages in development of the project.

SYLLABUS FOR THE BATCH FROM THE YEAR 2022 TO YEAR 2025

Programme Code: BCA

Programme Name: Bachelor of Computer Applications

(Semester I-VI)

Examinations: 2022-2025

P.G. Department of Computer Science & Applications

Khalsa College, Amritsar

Programme name: Bachelor of Computer Applications
Programme code: BCA
Programme Duration :3 years

Program Objectives:

1.	Provide a strong foundation in fundamentals of computers.
2.	Prepare the students with exceptional skills of problem solving, communication and leadership skills.
3.	The program prepares the young professional for a range of computer applications, computer organization, techniques of Computer Networking, Software Engineering, Web development, Database management and Advance Java
4.	Facilitate overall understanding of the requirements of the subjects.
5.	Prepare the students to provide professional solutions to real time problems.

Program Specific Outcomes (PSOs):

PSO-1.	To enable students to get jobs in IT sector
PSO-2.	To demonstrate advanced skills in the effective analysis design and realization of business system utilizing contemporary information technology.
PSO-3.	To gain knowledge to become proficient in computer programming like C, C++, Python, Java and apply standard software engineering process and strategies in software project development using open source programming environment to deliver quality products for business success.
PSO-4.	To possess the knowledge of web designing and networking.

Bachelor of Computer Applications

Semester – I

Sr. No.	Paper Code	Paper Name	Marks				Page No.
			Theory	Practical	Internal Assessment	Total	
1	BCA-111	Introduction to Programming –C	56	-	19	75	113-114
2	BCA-112	Introduction to Computers and Information Technology	56	-	19	75	115-116
3	BCA-113	Applied & Discrete Mathematics	56	-	19	75	117-118
4	BCSE-1122	Communication Skills in English	37	-	13	50	119-120
5	BHPB-1101/BPBI 1102/BPHC-1104	Punjabi/Basic Punjabi (Mudhli Punjabi) (Compulsory)/ Punjab History & Culture	37	-	13	50	121-124
6	BCA-114P	Practical–I (MS Office 2010/Open Office and C Programming)	-	56	19	75	125
7	ZDA111	*Drug Abuse: Problem, Management and Prevention(Compulsory Paper)	37		13	50	126-128

- **Marks of Paper-VII will not be included in the Total Marks**

Bachelor of Computer Applications (Semester – I)

BCA-111: Introduction to Programming - C

Time: 3 Hours **M. Marks: 75**
Credit Hours (per week):4 **Theory Marks: 56**
Total Hours: 60 **Theory Internal Assessment Marks: 19**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks**.

Course Objectives:

1.	The course is designed to provide complete knowledge of C language.
2.	Students will be able to develop logics which will help them to create programs, applications in C.
3.	Also, by learning the basic programming constructs they can easily switch over to any other language in future.

UNIT -I

Fundamentals: Character set, Identifiers and Key Words, Data types, Constants, Variables, Expressions, Statements, Symbolic Constants.
Operations and Expressions: Arithmetic operators, Unary operators, Relational Operators, Logical Operators, Assignment and Conditional Operators, Library functions. Data Input and Output statements
Control Statements: Preliminaries, While, Do–while and For statements, Nested loops, If–else, Switch, Break – Continue statements.
Program Structure Storage Class: Automatic, external and static variables, multiple programs, more about library functions.

UNIT -II

Functions: Brief overview, defining, accessing functions, passing arguments to function, specifying argument data types, function prototypes, recursion.

Arrays: Defining, processing an array, passing arrays to a function, multi–dimensional arrays.
Strings: String declaration, string functions and string manipulation
Structures & Unions: Defining and processing a structure, user defined data types, structures and pointers, passing structures to functions, self-referenced structure, unions.
Pointers: Fundamentals, pointer declaration, passing pointer to a function, pointer and one-dimensional arrays, operation on pointers, pointers & multi–dimensional arrays of pointers, passing functions, other functions, more about pointer declarations.

References:

1. Balaguruswamy: "Programming in ANSIC".
2. Scaum Outline Series: "Programming inC".
3. Dennis & Ritchie: "Programming inC".
4. Stephen G. Kochar: "CProgramming".

Course Outcomes :

On Completing the course, the students will be able to:

CO-1.	Use the fundamentals of C programming in trivial problem solving
CO-2.	Identify solution to a problem and apply control structures and user defined functions for solving the problem
CO-3.	Demonstrate the use of Strings and string handling functions
CO-4.	Gain ability to work with arrays of complex objects.
CO-5.	Apply skill of identifying appropriate programming constructs for problem solving.

Bachelor of Computer Applications (Semester – I)

BCA-112: Introduction to Computers and Information Technology

Time: 3 Hours **M. Marks: 75**
Credit Hours (per week):4 **Theory Marks: 56**
Total Hours: 60 **Theory Internal Assessment Marks: 19**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks**.

Course Objectives:

1.	To familiarize the various parts of computer.
2.	To study application of computers in different fields.
3.	To recall the evolution of computers through various generation.
4.	To acquire the knowledge of working of input and output devices.
5.	To impart the knowledge of operating system and its types.
6.	Hands on practice of MS office software.

UNIT-I

Introduction to Computers and its Applications:
Computer as a system, basic concepts, functional units and their inter relation.

- Milestones in Hardware and Software.
- Batch oriented / on–line / real time applications.
- Application of computers.

Interacting with the Computer
Input Devices: Keyboard, mouse, light pen, touch screens, Bar Code reader, joystick, source data automation, (MICR, OMR, OCR), screen assisted data entry: portable / handheld terminals for data collection, vision input systems.

Output Devices: Monitor, Serial line page printers, plotters, voice response units.

Word Processor: Overview, creating, saving, opening, importing, exporting and inserting files, formatting pages, paragraphs and sections, indents and outdents, creating lists and numbering. Headings, styles, fonts and font size, Editing, positioning and viewing texts, Finding and replacing text, inserting page breaks, page numbers, book marks, symbols and dates. Using tabs and tables, header, footer and printing

UNIT-II

Data Storage Devices and Media: Primary storage (Storage addresses and capacity, type of memory), Secondary storage, Magnetic storage devices and Optical Storage Devices

Presentation Software: Presentation overview, entering information, Presentation creation, opening and saving presentation, inserting audio and video

Spreadsheet: Spreadsheet overview, Editing, Formatting, Creating formulas, Graphs.

Any Open-Source Software like Apache Open Office, Libre Office, Google Docs or Microsoft Office may be used.

References:

1. Computer Fundamentals – P.K. Sinha.
2. Introduction to Computers – N. Subramanian.
3. Introduction to Computers – Peter Norton Mcgraw Hill.
4. MS–Office _ BPB Publications.
5. Windows Based Computer Courses _ Gurvinder Singh & Rachpal Singh, Kalyani Pub.
6. Ebooks at OpenOffice.org
7. A Conceptual guide to OpenOffice.org3, 2nd Edition, R. Gabriel Gurley

Course Outcomes (Cos):

On Completing the course, the students will be able to:

CO-1.	Understand the computer terminology
CO-2.	Gain insight of working of input and output devices.
CO-3.	Develop skills of working with MS-Word, MS-Powerpoint, MS-excel.
CO-4.	Possess the knowledge of importance of operating system in computer.
CO-5.	Understand the concept of storing of data in memory and its types.

Bachelor of Computer Applications (Semester – I)

BCA-113: Applied & Discrete Mathematics

Time: 3 Hours **M. Marks: 75**
Credit Hours (per week):4 **Theory Marks: 56**
Total Hours:60 **Theory Internal Assessment Marks: 19**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus with answer to each question up to 10 lines in length. Students will attempt 6 questions. Each question will carry two marks; the total weightage being **12 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The candidates will be required to attempt any two questions. Each question will carry **11 marks.** The total weightage of this section shall be **22 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The candidates will be required to attempt any two questions. Each question will carry **11 marks.** The total weightage of this section shall be **22 marks.**

Course Objectives

1.	The major objective of this course is to explore those mathematical concepts which are applied into computer application/programming in well manner.
2.	To strengthen the logic development ability in students by solving the problems related to symbolic logics, matrix operations and Boolean algebra etc.

UNIT-I

Sets and Relations: Definition of sets, subsets, complement of a set, universal set, intersection and union of sets, De-Morgan's laws, Cartesian products, Equivalent sets, Countable and uncountable sets, minset, Partitions of sets, Relations: Basic definitions, graphs of relations, properties of relations
Logic and Propositional Calculus: Proposition and Compound Propositions, basic Logical Operations, Propositions and Truth Tables, Tautologies and Contradictions, Logical Equivalence, Duality law, Algebra of propositions, Conditional and Bi conditional Statements, Arguments, Logical Implication, Propositional Functions, Predicates and Quantifiers, Negation of Quantified Statements, Inference theory of the predicates calculus.
Boolean Algebra: Boolean algebra and its duality, Duality, Boolean Algebra as Lattices, Boolean identities, sub-algebra, Representation Theorem, Sum-of-Products Form for Sets, Sum of-Products Form for Boolean Algebra, Minimal Boolean Expressions, Prime Implicants, Boolean Functions, Karnaugh Maps.

UNIT-II

Matrices: Introduction of a Matrix, its different kinds, matrix addition and scalar multiplication, multiplication of matrices, transpose etc. Square matrices, inverse and rank of a square matrix, Matrix Inversion method.

Graph Theory: A general introduction, simple and multi graphs, directed and undirected graphs, Eulerian and Hamiltonian Graphs, Shortest path algorithms, Chromatic number, Bi partite graph, graph coloring.

References:

1. Lipschutz, S. and Lipson, M.: Discrete Mathematics (Schaum's outlines Series).
2. Kolman and Busby "Discrete Mathematical structures for Computer Sciences" PHI.
3. Alan Doerr,"Applied Discrete Structures for Computer Science", Galgotia Publications.
4. Trambley, J.P. and Manohar,R: Discrete Mathematical Structures with Applications to Computer Science.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Simplify and evaluate basic logic statements using compound statements, implications, inverses, converses, and contrapositives using truth tables and the properties of logic.
CO-2.	Develop ability of conversion of logic sentence in terms of predicates, quantifiers, and logical connectives.
CO-3.	Use various matrix operations such as matrix addition, multiplication, and transpose, inverse and calculating rank of matrix.
CO-4.	Apply the operations of sets, relations and use Venn diagrams to solve real life mathematical.
CO-5.	Get in-depth knowledge of graph theory from the point of view of problem solving strategy used in game design and assignment problems.

Bachelor of Computer Applications (Semester – I)

BCSE-1122: COMMUNICATION SKILLS IN ENGLISH

Time: 3 Hours **Max. Marks: 50**
Credit Hours (per week):4 **Theory Marks: 37**
Total Hours: 60 **Internal assessment: 13**

Suggested Pattern of Question Paper:
The question paper will consist of Seven skill–oriented questions from Reading and Writing Skills. The first 6 Questions carry 5 marks each. The 7th Question carries 7 marks. The questions shall be phrased in a manner that students know clearly what is expected of them. There will be internal choice wherever possible.

i) Comprehension questions of an unseen passage.
ii) Personal letter Official/Business letters.
iii) Writing notices/agenda/resolution/ minutes for public circulation on topics of professional interest
iv) Writing resume or converting a biographical note into resume
v) Writing news report based on a given heading
vi) Do as directed Articles Units 69-81
Conjunctions Units 113-120 (6X5=30 Marks)
vii) Translation from English to Vernacular (Punjabi/ Hindi) (Isolated Sentences) (1X7=7 Marks)

Course Objectives:

1.	Effective Communication skills are about conveying our message to others clearly.
2.	It engages the choice and use of an effective channel and presentation of information to the target audience.
3.	The main objective is to articulate the inner thoughts in a more channelized manner.
4.	The mutual understanding of our needs, wishes, hopes.

Course Contents:
1. Reading Skills: Reading tactics and strategies; Reading purposes–kinds of purposes and associated comprehension; Reading for direct meanings; Reading for understanding concepts, details, coherence, logical progression and meanings of phrases/ expressions.
Activities:
a) Active reading of passages on general topics
b) Reading newspaper, articles, editorials etc.
c) Short questions based on content and development of ideas of a given paragraph.
2. Writing Skills: Guidelines for effective writing; writing styles for application, resume, personal letter, official/ business letter, memo, notices etc.
Activities:
a) Personal and business letters.
b) Converting a biographical note into a sequenced resume.
c) Writing notices for circulation/ boards.
d) Making notes of given passage with headings and sub-headings
e) Writing newspaper reports based on given heading.

Refereces:

Murphy's English Grammar (by Raymond Murphy) CUP

Refereces:

1. *Oxford Guide to Effective Writing and Speaking* by John Seely.
2. *The Written Word* by Vandana R Singh, Oxford University Press

Course Outcomes:

CO-1.	One is point of view is understood by others.
CO-2.	The main outcome is to socialize and be in touch with the community
CO-3.	It enhances and develops the two-way processes which is helpful to establish healthy relationship among the speakers and the listeners
CO-4.	People are persuaded and dissuaded from doing different things.

Bachelor of Computer Applications (Semester – I)

BHPB-1101: ਲਾਜ਼ਮੀ ਪੰਜਾਬੀ

ਸਮਾਂ : 3 ਘੰਟੇ ਕ੍ਰੈਡਿਟ ਪ੍ਰਤੀ ਹਫਤਾ : 04

ਕੁੱਲ ਘੰਟੇ : 60 ਥਿਊਰੀ ਅੰਕ : 37, ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ : 13, ਕੁੱਲ ਅੰਕ : 50

ਅੰਕ-ਵੰਡ ਅਤੇ ਪ੍ਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

ਸਿਲੇਬਸ ਦੇ ਚਾਰ ਭਾਗ ਹਨ ਪਰ ਪ੍ਰਸ਼ਨ-ਪੱਤਰ ਦੇ ਪੰਜ ਭਾਗ ਹੋਣਗੇ। ਪਹਿਲੇ ਚਾਰ ਭਾਗਾਂ ਵਿਚ 02-02 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰੇਕ ਭਾਗ ਵਿਚੋਂ 01-01 ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਲਾਜ਼ਮੀ ਹੋਵੇਗਾ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ (08) ਅੰਕ ਹੋਣਗੇ। ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਪੰਜਵੇਂ ਭਾਗ ਵਿਚ ਸਾਰੇ ਸਿਲੇਬਸ ਵਿਚੋਂ 01-01 ਅੰਕ ਦੇ ਛੇ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ, ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ 05 ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ ਦੇਣਾ ਲਾਜ਼ਮੀ ਹੋਵੇਗਾ। ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ-ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

ਨੋਟ: ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ 13 ਅੰਕਾਂ ਦੀ ਹੈ, ਜੋ ਕਾਲਜ ਵੱਲੋਂ ਨਿਰਧਾਰਿਤ ਦਿਸ਼ਾ ਨਿਰਦੇਸ਼ਾਂ ਅਨੁਸਾਰ ਥਿਊਰੀ ਅੰਕਾਂ ਤੋਂ ਵੱਖਰੀ ਹੋਵੇਗੀ। ਇਸ ਪੇਪਰ ਦੇ ਕੁੱਲ ਅੰਕ 37+13 = 50 ਹਨ।

ਕੋਰਸ ਦਾ ਉਦੇਸ਼ Course Objective

- ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਸਾਹਿਤਕ ਰੁਚੀਆਂ ਪੈਦਾ ਕਰਨਾ।
- ਆਲੋਚਨਾਤਮਕ ਰੁਚੀਆਂ ਵਿਕਸਤ ਕਰਨਾ।
- ਮਾਤ ਭਾਸ਼ਾ ਦੀ ਸਮਝ ਨੂੰ ਵਿਕਸਤ ਕਰਨਾ

ਪਾਠ-ਕ੍ਰਮ ਨਤੀਜੇ Course Outcomes (COs)

- ਵਿਦਿਆਰਥੀ ਦੀ ਸਾਹਿਤਕ ਸੋਚ-ਸਮਝ ਵਿਕਸਤ ਹੋਵੇਗੀ।
- ਉਸ ਵਿਚ ਸਾਹਿਤ ਰੁਚੀਆਂ ਵਿਕਸਤ ਹੋਣਗੀਆਂ।
- ਉਸ ਵਿਚ ਸਾਹਿਤ ਸਿਰਜਣਾ ਦੀ ਸੰਭਾਵਨਾ ਵਧੇਗੀ।
- ਉਹ ਕਿਸੇ ਵੀ ਵਿਸ਼ੇ ਦਾ ਗਹਿਨ ਅਧਿਐਨ ਕਰਨ ਦੇ ਕਾਬਲ ਹੋਵੇਗਾ।
- ਉਹ ਮਾਤ ਭਾਸ਼ਾ ਦੇ ਵਿਕਾਸ ਵਿਚ ਵਿਸ਼ੇਸ ਯੋਗਦਾਨ ਪਾਉਣਗੇ।

ਪਾਠ-ਕ੍ਰਮ

ਭਾਗ-ਪਹਿਲਾ

ਸਾਹਿਤ ਦੇ ਰੰਗ, ਡਾ. ਮਹਿਲ ਸਿੰਘ (ਸੰਪਾ.), ਰਵੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।
ਭਾਗ ਪਹਿਲਾ - ਕਵਿਤਾ ਅਤੇ ਕਹਾਣੀ, ਡਾ. ਮਹਿਲ ਸਿੰਘ ਅਤੇ ਡਾ. ਆਤਮ ਰੰਧਾਵਾ (ਸਹਿ ਸੰਪਾ.)
(ਕਵਿਤਾ ਭਾਗ ਵਿਚੋਂ ਪ੍ਰਸੰਗ ਸਹਿਤ ਵਿਆਖਿਆ/ਵਿਸ਼ਾ-ਵਸਤੂ। ਕਹਾਣੀ ਭਾਗ ਵਿਚੋਂ ਸਾਰ/ਵਿਸ਼ਾ-ਵਸਤੂ)

ਭਾਗ-ਦੂਜਾ

ਇਤਿਹਾਸਿਕ ਯਾਦਾਂ
ਸ. ਸ. ਅਮੋਲ (ਸੰਪਾ.), ਪੰਜਾਬੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।
(ਨਿਬੰਧ 1 ਤੋਂ 6 ਤਕ ਸਾਰ/ ਵਿਸ਼ਾ-ਵਸਤੂ/ਸ਼ੈਲੀ)

ਭਾਗ-ਤੀਜਾ

(ੳ) ਪੈਰ੍ਹਾ ਰਚਨਾ (ਤਿੰਨਾਂ ਵਿਚੋਂ ਇਕ)
(ਅ) ਪੈਰ੍ਹਾ ਪੜ੍ਹ ਕੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ

ਭਾਗ-ਚੌਥਾ

(ੳ) ਭਾਸ਼ਾ ਵੰਨਗੀਆਂ : ਭਾਸ਼ਾ ਦਾ ਟਕਸਾਲੀ ਰੂਪ, ਭਾਸ਼ਾ ਅਤੇ ਉਪ-ਭਾਸ਼ਾ ਵਿਚਲਾ ਅੰਤਰ, ਪੰਜਾਬੀ ਉਪ-ਭਾਸ਼ਾਵਾਂ ਦੇ ਪਛਾਣ-ਚਿੰਨ੍ਹ
(ਅ) ਪੰਜਾਬੀ ਭਾਸ਼ਾ : ਨਿਕਾਸ ਤੇ ਵਿਕਾਸ

Bachelor of Computer Applications (Semester – I)

BPBI-1102: **ਮੁਢਲੀ ਪੰਜਾਬੀ**

(In Lieu of Compulsory Punjabi)

ਸਮਾਂ : 3 ਘੰਟੇ ਕ੍ਰੈਡਿਟ ਪ੍ਰਤੀ ਹਫਤਾ : 04

ਕੁੱਲ ਘੰਟੇ : 60 ਥਿਊਰੀ ਅੰਕ : 37, ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ : 13, ਕੁੱਲ ਅੰਕ : 50

ਅੰਕ-ਵੰਡ ਅਤੇ ਪ੍ਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

- ਪਹਿਲੇ ਭਾਗ ਵਿਚੋਂ ਚਾਰ ਵਰਣਨਾਤਮਕ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਤਿੰਨ ਪ੍ਰਸ਼ਨਾਂ ਦਾ ਉੱਤਰ ਦੇਣਾ ਲਾਜ਼ਮੀ ਹੈ। ਹਰ ਪ੍ਰਸ਼ਨ ਦੇ ਚਾਰ-ਚਾਰ ਅੰਕ ਹਨ। ਭਾਗ ਦੂਸਰਾ ਵਿਚੋਂ ਦੋ-ਦੋ ਅੰਕ ਦੇ ਪੰਜ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਸਾਰੇ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹਨ। ਭਾਗ ਤੀਸਰਾ ਵਿਚੋਂ ਤਿੰਨ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਲਾਜ਼ਮੀ ਹਨ ਜਿਨ੍ਹਾਂ ਦੇ ਪੰਜ-ਪੰਜ ਅੰਕ ਹਨ। ਭਾਗ ਚੌਥਾ ਵਿਚ ਪੰਜ ਅਸ਼ੁੱਧ ਸ਼ਬਦਾਂ ਨੂੰ ਸ਼ੁੱਧ ਕਰਕੇ ਲਿਖਣਾ ਹੋਵੇਗਾ।

  ਨੋਟ: ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ 13 ਅੰਕਾਂ ਦੀ ਹੈ, ਜੋ ਕਾਲਜ ਵੱਲੋਂ ਨਿਰਧਾਰਿਤ ਦਿਸ਼ਾ ਨਿਰਦੇਸ਼ਾਂ ਅਨੁਸਾਰ ਥਿਊਰੀ ਅੰਕਾਂ ਤੋਂ ਵੱਖਰੀ ਹੋਵੇਗੀ। ਇਸ ਪੇਪਰ ਦੇ ਕੁਲ ਅੰਕ 37+13 = 50 ਹਨ।

ਕੋਰਸ ਦਾ ਉਦੇਸ਼ Course Objective

- ਵਿਦਿਆਰਥੀ ਨੂੰ ਸ਼ੁੱਧ ਪੰਜਾਬੀ ਪੜ੍ਹਨਾ-ਲਿਖਣਾ ਸਿਖਾਉਣਾ।
- ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੀਆਂ ਵਿਆਕਰਨਕ ਬਾਰੀਕੀਆਂ ਤੋਂ ਜਾਣੂ ਕਰਾਉਣਾ।
- ਸ਼ੁੱਧ ਸੰਚਾਰ ਨੂੰ ਵਿਕਸਤ ਕਰਨਾ।

ਪਾਠ-ਕ੍ਰਮ ਨਤੀਜੇ Course Outcomes (COs)

- ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਅਤੇ ਗੁਰਮੁਖੀ ਲਿਪੀ ਦੀ ਸਿਖਲਾਈ ਵਿਚ ਮੁਹਾਰਤ ਹਾਸਿਲ ਕਰਨਗੇ।
- ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਵਿਚ ਮੁਹਾਰਨੀ, ਲਗਾਂ-ਮਾਤਰਾਂ, ਸਵਰ ਅਤੇ ਵਿਅੰਜਨ ਦੀ ਪਛਾਣ ਅਤੇ ਵਰਤੋਂ ਦੁਆਰਾ ਉਨ੍ਹਾਂ ਦੀ ਸਮਝ ਨੂੰ ਵਿਕਸਿਤ ਹੋਵੇਗੀ।
- ਪੰਜਾਬੀ ਸ਼ਬਦ-ਜੋੜਾਂ ਦੀ ਜਾਣਕਾਰੀ ਹਾਸਿਲ ਕਰਕੇ ਉਹ ਸ਼ੁੱਧ ਪੰਜਾਬੀ ਲਿਖਣ-ਪੜ੍ਹਨ ਦੇ ਸਮਰੱਥ ਹੋਣਗੇ।
- ਉਹ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੇ ਵਿਆਕਰਨ ਪ੍ਰਬੰਧ ਦੀ ਜਾਣਕਾਰੀ ਹਾਸਿਲ ਕਰਨਗੇ।

ਪਾਠ-ਕ੍ਰਮ

ਭਾਗ-ਪਹਿਲਾ

(ੳ) ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਤੇ ਗੁਰਮੁਖੀ ਲਿਪੀ :

ਨਾਮਕਰਣ ਤੇ ਸੰਖੇਪ ਜਾਣ-ਪਛਾਣ: ਗੁਰਮੁਖੀ ਵਰਣਮਾਲਾ, ਅੱਖਰ ਕ੍ਰਮ, ਸਵਰ ਵਾਹਕ (ਓ, ਅ, ੲ), ਲਗਾਂ-ਮਾਤਰਾਂ, ਪੈਰ ਵਿਚ ਬਿੰਦੀ ਵਾਲੇ ਵਰਨ, ਪੈਰ ਵਿਚ ਪੈਣ ਵਾਲੇ ਵਰਨ, ਬਿੰਦੀ, ਟਿੱਪੀ, ਅੱਧਕ

(ਅ) ਸਿਖਲਾਈ ਤੇ ਅਭਿਆਸ

ਭਾਗ-ਦੂਜਾ

ਗੁਰਮੁਖੀ ਆਰਥੋਗਰਾਫੀ ਅਤੇ ਉਚਾਰਨ :

ਸਵਰ, ਵਿਅੰਜਨ : ਮੁਢਲੀ ਜਾਣ-ਪਛਾਣ ਅਤੇ ਉਚਾਰਨ, ਮੁਹਾਰਨੀ, ਲਗਾਂ-ਮਾਤਰਾਂ ਦੀ ਪਛਾਣ

ਭਾਗ-ਤੀਜਾ

ਪੰਜਾਬੀ ਸ਼ਬਦ-ਜੋੜ : ਮੁਕਤਾ (ਦੋ ਅੱਖਰਾਂ ਵਾਲੇ ਸ਼ਬਦ, ਤਿੰਨ ਅੱਖਰਾਂ ਵਾਲੇ ਸ਼ਬਦ), ਸਿਹਾਰੀ ਵਾਲੇ ਸ਼ਬਦ, ਬਿਹਾਰੀ ਵਾਲੇ ਸ਼ਬਦ, ਔਂਕੜ ਵਾਲੇ ਸ਼ਬਦ, ਦੁਲੈਂਕੜ ਵਾਲੇ ਸ਼ਬਦ, ਲਾਂ ਵਾਲੇ ਸ਼ਬਦ, ਦੁਲਾਵਾਂ ਵਾਲੇ ਸ਼ਬਦ, ਹੋੜੇ ਵਾਲੇ ਸ਼ਬਦ, ਕਨੌੜੇ ਵਾਲੇ ਸ਼ਬਦ, ਲਗਾਖਰ (ਬਿੰਦੀ, ਟਿੱਪੀ, ਅੱਧਕ) ਵਾਲੇ ਸ਼ਬਦ

ਭਾਗ-ਚੌਥਾ

ਸ਼ੁੱਧ-ਅਸ਼ੁੱਧ ਸ਼ਬਦ

Bachelor of Computer Applications (Semester – I)
BPHC-1104: PUNJAB HISTORY & CULTURE (From Earliest Times to C 320)
(Special Paper in lieu of Punjabi compulsory)
(For those students who are not domicile of Punjab)

Time: 3 Hours **Total. Marks: 50**
Credit Hours (per week):4 Total Hours:60 **Theory: 37**
Internal Assessment: 13

Instructions for Paper Setter:
The question paper consists of five units: I, II, III, IV and V. Units I, II, III and IV will have two questions each. Each question carries 8 marks. The students are to attempt one question from each unit approximately in 800 words. Unit-V consists of 7 short answer type questions to be set from the entire syllabus. Students are to attempt any 5 questions in about 20 words each. Each question carries 1 mark.
Note: The examiner is to set the question paper in two languages: English & Hindi.

Course Objectives:

1.	The main objective of this course is to educate the history and culture of the Ancient Punjab to the students who are not domicile of the Punjab.
2.	It aims to familiarize these students with the physical features of ancient Punjab and its impact on its history and culture.
3.	It also provides them information about the different sources to construct the history and culture of the ancient Punjab.
4.	The course intends to provide knowledge of social, economic, religious life of the Harrapan civilization, Indo-Aryans, teachings and impact of Jainism and Buddhism in the Punjab

UNIT-I

1. Physical features of the Punjab and impact on history.
2. Sources of the ancient history of Punjab.

UNIT-II

3. Harappan Civilization: Town planning; social, economic and religious life of the Indus Valley People.
4. The Indo-Aryans: Original home and settlement in Punjab.

UNIT-III

5. Social, Religious and Economic life during Rig Vedic Age.
6. Social, Religious and Economic life during later Vedic Age.

UNIT-IV

7. Teachings and impact of Buddhism.
8. Jainism in the Punjab.

References:-

1. L. Joshi (ed), History and Culture of the Punjab, Art-I, Patiala, 1989 (3rd edition)
2. L.M. Joshi and Fauja Singh (ed), History of Punjab, Vol.I, Patiala 1977.
3. Budha Parkash, Glimpses of Ancient Punjab, Patiala, 1983.
4. B.N. Sharma, Life in Northern India, Delhi. 1966.

Course Outcomes:

After completion of the course, the students will be able to learn:

CO-1	The history and culture of the Ancient Punjab.
CO-2	Physical features of ancient Punjab.
CO-3	The sources of the history of the Punjab .
CO-4	Social, economic, religious life of the Harrapan civilization and Vedic-Aryans.
CO-5	Teachings and impact of Jainism and Buddhism in the Punjab.

Bachelor of Computer Applications (Semester –I)

BCA-104P: Practical –I

(MS Office 2010/Open Office & Basic C Programming)

Credit Hours (Per Week):8

Total Hours:120 **M. Marks: 75**

Practical Marks: 56

Practical Internal Assessment Marks: 19

Course Objectives:

1.	To familiarize the various parts of computer.
2.	To study application of computers in different fields.
3.	To recall the evolution of computers through various generation.
4.	To learn the fundamental programming concepts and methodologies which are essential to building good C/C++ programs.
5.	To practice the fundamental programming methodologies in the C/C++ programming language via laboratory experiences.

Practical- MS Office 2010/Open Office & Basic C Programming

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Use the fundamentals of C programming in trivial problem solving.
CO-2.	Apply skill of identifying appropriate programming constructs for problem solving.
CO-3.	Gain ability to work with arrays of complex objects.
CO-4.	Develop skills of working with MS Word, MS Powerpoint, MS excel.
CO-5.	Understand the concept of storing of data in memory and its types.

Bachelor of Computer Applications (Semester –I)
ZDA111: Drug Abuse: Problem, Management and Prevention
PROBLEM OF DRUG ABUSE
(Compulsory for all Under Graduate Classes)

Credit Hours (per week): 1.5 hrs. Total Hours: 22.5 hrs.
Max. Marks:50

Instructions for the Paper Setters:

Section–A: (15 Marks): It will consist of five short answer type questions. Candidates will be required to attempt three questions, each question carrying 05 marks. Answer to any of the questions should not exceed two pages.

Section–B: (20 Marks) It will consist of four essay type questions. Candidates will be required to attempt two questions, each question carrying 10 marks. Answer to any of the questions should not exceed four pages.

Section–C: (15 Marks) It will consist of two questions. Candidate will be required to attempt one question only. Answer to the question should not exceed 5 pages.

Course Objectives

The course aims to:

CO-1.	Generate the awareness against drug abuse.
CO-2.	Describe a variety of models and theories of addiction and other problems related to substance abuse.
CO-3.	Describe the behavioral, psychological, physical health and social impact of psychoactive substances.
CO-4.	Provide culturally relevant formal and informal education programs that raise awareness and support for substance abuse prevention and the recovery process.
CO-5.	Describe factors that increase likelihood for an individual, community or group to be at risk of substance use disorders.

UNIT–I

- **Meaning of Drug Abuse**

  Meaning, Nature and Extent of Drug Abuse in India and Punjab.

UNIT-II

- **Consequences of Drug Abuse for:**

  Individual : Education, Employment and Income.

  Family : Violence.

  Society : Crime.

  Nation : Law and Order problem.

UNIT-III

- **Management of Drug Abuse**

Medical Management: Medication for treatment and to reduce withdrawal effects.

UNIT-IV

- Psychiatric Management: Counseling, Behavioral and Cognitive therapy.
- Social Management: Family, Group therapy and Environmental Intervention.

References:

1. Ahuja, Ram (2003), Social Problems in India, Rawat Publication, Jaipur.
2. Extent, Pattern and Trend of Drug Use in India, Ministry of Social Justice and Empowerment, Government of India, 2004.
3. Inciardi, J.A. 1981. The Drug Crime Connection. Beverly Hills: Sage Publications. 23
4. Jasjit Kaur Randhawa & Samreet Randhawa, "Drug Abuse-Problem, Management & Prevention", KLS, ISBN No. 978-81-936570-6-5, (2018).
5. Jasjit Kaur Randhawa & Samreet Randhawa, "Drug Abuse Problem, Management & Prevention", KLS, ISBN No. 978-81-936570-8-9, (2019).
6. Jasjit Kaur Randhawa & Samreet Randhawa, "ਡਰੱਗਜ਼ ਦੁਰਵਰਤੋਂ-(ਨਸ਼ਾਖੋਰੀ) ਸਮੱਸਿਆ, ਪ੍ਰਬੰਧਨ ਅਤੇ ਰੋਕਥਾਮ", KLS, ISBN No. 978-81-936570-7-1, (2018).
7. Jasjit Kaur Randhawa, "Drug Abuse -Management & Prevention", KLS, ISBN No. 978-93-81278-80-2, (2018).
8. Kapoor. T. (1985) Drug epidemic among Indian Youth, New Delhi: Mittal Pub.
9. Modi, Ishwar and Modi, Shalini (1997) Drugs: Addiction and Prevention, Jaipur: Rawat Publication.
10. National Household Survey of Alcohol and Drug abuse. (2003) New Delhi, Clinical Epidemiological Unit, All India Institute of Medical Sciences, 2004.
11. Rama Gandotra & Jasjit Kaur Randhawa, "ਡਰੱਗਜ਼ ਦੁਰਵਰਤੋਂ-(ਨਸ਼ਾਖੋਰੀ) ਪ੍ਰਬੰਧਨ ਅਤੇ ਰੋਕਥਾਮ", KLS, ISBN No. 978-93-81278-87-1, (2018).
12. Sain, Bhim 1991, Drug Addiction Alcoholism, Smoking obscenity New Delhi: Mittal Publications.
13. Sandhu, Ranvinder Singh, 2009, Drug Addiction in Punjab: A Sociological Study. Amritsar: Guru Nanak Dev University.
14. Singh, Chandra Paul 2000. Alcohol and Dependence among Industrial Workers: Delhi: Shipra.

15. Sussman, S and Ames, S.L. (2008). Drug Abuse: Concepts, Prevention and Cessation, Cambridge University Press.
16. World Drug Report 2010, United Nations office of Drug and Crime.
17. World Drug Report 2011, United Nations office of Drug and Crime.

Course Outcomes:

The students will be able:

CO-1.	To describe issues of cultural identity, ethnic background, age and gender in prevention, treatment and recovery.
CO-2.	To describe warning sign, symptoms, and the course of substance use disorders.
CO-3.	To describe principles and philosophy of prevention, treatment and recovery.
CO-4.	To describe current and evidenced-based approaches practiced in the field of addictions.

Bachelor of Computer Applications
Semester – II

Sr. No.	Paper Code	Paper Name	Marks				Page No.
			Theory	Practical	Internal Assessment	Total	
1	BCA-121	Introduction to Programming– C++	56	-	19	75	130-131
2	BCA-122	Principles of Digital Electronics	56	-	19	75	132-133
3	BCA-123	Numerical Methods &Statistical Techniques	56	-	19	75	134-135
4	BCSE1222	Communication Skills in English	37	-	13	50	136-137
5	BHPB-1201/ BPBI-1202/ BPHC-1204	Punjabi/Basic Punjabi (Mudhli Punjabi) (Compulsory)/ Punjab History & Culture	37	-	13	50	138-141
6	BCA-124P	Practical–C++ Programming Language	-	56	19	75	142
7	ZDA112	*Drug Abuse: Problem, Management and Prevention (Compulsory Paper)	37		13	50	143-144

- **Marks of Paper VII will not be included in the Total Marks**

Bachelor of Computer Applications (Semester – II)

BCA-121: Introduction to Programming - C++

Time: 3 Hours **M. Marks: 75**
Credit Hours (per week):4 Total Hours:60 **Theory Marks: 56**
Theory Internal Assessment Marks: 19

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks**.

Course Objectives:

The learning objectives of this course are:

1.	To understand how C++ improves C with object-oriented features.
2.	To learn how to design C++ classes for code reuse.
3.	To Anaylse how to implement copy constructors and class member functions.
4.	To understand the concept of data abstraction and encapsulation.
5.	To learn how to overload functions and operators in C++.
6.	To Know how containment and inheritance promote code reuse in C++.
7.	To learn how inheritance and virtual functions implement dynamic binding with polymorphism.
8.	To learn how to design and implement generic classes with C++ templates.

UNIT-I

Programming Paradigms: Introduction to the object-oriented approach towards programmingby discussing Traditional, Structured Programming methodology.
Objects & Classes: Object Definition, Instance, Encapsulation, Data Hiding, Abstraction, Inheritance, Messages, Method, Polymorphism, Classes, Candidate & Abstract Classes to beexamples of the Design process.

Object Oriented Programming using C++: Characteristics of OOP, Overview of C++, I/Ousing cout and cin, Objects and Classes, Member functions and data, private & public, constructor & destructor, Constructor Overloading, Types of Constructors.

UNIT-II

Function Overloading: Function Overloading, Default Arguments, Ambiguity in Function Overloading.

Operator Overloading: Overloading unary and binary operators, Type Conversion usingOperator Overloading

Inheritance: Concept of inheritance, Base & derived classes, Access Specifiers, ClassHierarchies, Types of Inheritance with examples.

Virtual Functions and Polymorphism: Virtual functions, friend functions, static function, thispointer, polymorphism, Types of Polymorphism with examples, templates, class templates.

References:

1. Teach yourself C++, Herbert Schildth, Tata McGraw Hill.
2. Designing Object Oriented Software Rebacca Wirfs - Brock Brian Wilerson, PHI.
3. Object Oriented Programming in Turbo C++, Robert Lafore, Galgotia Publication.
4. Designing Object Oriented Applications using C++ & Booch Method, Robert C. Martin.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Understand the difference between the top-down and bottom-up approach.
CO-2.	Describe the object-oriented programming approach in connection with C.
CO-3.	Apply the concepts of object-oriented programming.
CO-4.	Illustrate the process of data file manipulations using C++.
CO-5.	Apply virtual and pure virtual function & complex programming situations.

Bachelor of Computer Applications (Semester – II)

BCA-122: Principles of Digital Electronics

Time: 3 Hours **Total Marks: 75**
Credit Hours (per week):4 Total Hours:60 **Theory M: 56**
Theory Internal Assessment M: 19

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks**.

Course Objective:

1.	To familiarize the concept of various number systems.
2.	To introduce the concept of logic gates and logic families.
3.	To acquire the knowledge of the minimization techniques in digital electronics.
4.	To design combinational circuits and sequential circuits using logic gates.
5.	To impart knowledge of how to design registers in digital electronics.
6.	To understand the concept of digital logic levels.

UNIT-I

1. Number Systems
Introduction to Adder & Subtractor, Binary Codes(BCD, Excess-3, Gray codes, ASCII), Binary Storage and Registers, Decimal, Binary, Octal and Hexadecimal Numbers. Complements. Signed Binary Numbers (Arithmetic Addition).

2. Boolean Algebra and Logic Gates
Basic Definitions, Postulates and theorems of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, De-Morgan's Theorem Reducing Boolean expressions, Digital Logic Gates: (AND, OR NOT, NAND, NOR, EX-OR, EX- NOR), Implementations using Basic Gates, Universal Gates

3. Minimization Techniques
Canonical and Standard forms SOP and POS of Boolean functions, K-Maps simplifications up to Five-Variable Map, Sum of Product and Product of Sums Simplification, Don't-Care Conditions.

UNIT-II

4. Combinational Logic

Half Adder and Full Adder, Binary Adder and Subtractor, Decimal Adder, Comparator, Decoders, Encoders, Multiplexers.

5. Synchronous Sequential Logic

Sequential Circuits, Latches, Flip-Flops (SR, JK, JK Master Slave D and T-type). Negative edge and Positive edge triggered clocks

6. Registers and Counters

Shift Registers:(Serial-in Serial-out, Serial-in Parallel-out, Parallel-in Serial-out, Parallel-in Parallel-out), Ripple Counters, Synchronous and Asynchronous Counters, Mod counters up/down counters

7. Memory and Programmable Logic

Introduction, Random-Access Memory, Memory Decoding, Error Detection and Correction, Read-Only Memory, Programmable Array Logic.

8.**Computer Concepts:** Basic Computer System, concepts of hardware and software, Operating Systems, Microcontrollers and Embedded Systems., Digital Signal Processing, Digital Signal Processor (DSP).

References:

1. Integrated Electronics by Millman, Halkias McGraw Hill.
2. Malvino: Digital Computer Electronics, McGraw Hill.
3. D.A. Hodges & H.G. Jackson, Analysis and Design of Integrated Circuits, International, 1983.
4. Joph. F. Wakerley, Digital Principles and Practices.
5. Ujjenbeck, John: Digital Electronics: A Modern Approach, Prentice Hall, 1994.
6. Mano, M. Morris: Digital Logic and Computer Design, Edition, 1993.
7. Digital Electronics by R.K Gaur.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Gain knowledge of different types of number systems and their conversions in digital electronics.
CO-2.	Use Boolean algebra to minimize and simplify Boolean expressions.
CO-3.	Illustrate realization of SOP and POS forms.
CO-4.	Undersatnd design of various combinational circuits using logic gates.
CO-5.	Design and develop sequential circuits using flip flops.

Bachelor of Computer Applications (Semester – II)

BCA-123: Numerical Methods & Statistical Techniques

Time: 3 Hours **Total Marks: 75**
Credit Hours (per week):4 Total Hours:60 **Theory Marks: 56**
Theory Internal Assessment M: 19

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks.**

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks**.

Note for Paper Setter:

I. That the program for numerical and statistical methods are to be written in C/C++.

II. Paper setter indicating thereby that the greater weightage is to be given to exercises rather than theoretical derivation of all numerical and statistical methods.

Course Objectives:

1.	To understand and implement various concepts of numerical and statistical methods to solve real life problems.
2.	To develop the mathematical skills of the students in the areas of numerical methods.
3.	To provide conceptual understanding of various numerical methods like solution of non-linear equations ,system of linear equations, interpolation, numerical differentiation and integration with an aim of helping the students to understand the fundamentals, concepts and practical use of these methods in the field of computer sciences and applications.
4.	To provide understanding of statistical problems like testing of hypotheses.

UNIT-I

Introduction:

1. Numerical Methods, Numerical methods versus numerical analysis, Errors and Measures of Errors.
2. Non–linear Equations, Iterative Solutions, Multiple roots and other difficulties, Interpolation methods, Methods of bi–section, False position method, Newton Raphson – Method.
3. Simultaneous Solution of Equations, Gauss Elimination Method Gauss Jordan Method.
4.Numerical Integration and different method Trapezoidal Rule, Simpson's 3/8 Rule.

UNIT- II

6 Interpolation and Curve Fitting, Lagrangian Polynomials, Newton's Methods: ForwardDifference Method, Backward Difference Method Divided Difference Method.

7 Least square fit linear trend Y = a+bx, Non–linear trend.

$Y = ax^b$

$Y = ab^x$

$Y = ae^x$

Polynomial fit: $Y = a+bx+cx^2$

Statistical Techniques:

1. Measure of Central Tendency, Mean Arithmetic, mean geometric, mean harmonic, Mean, Median, Mode.
2. Measures of dispersion, Mean deviation, Standard deviation, Co–efficient of variation.
3. Correlation for Bivariate data, Types of Correlation, Karl Pearson's Correlation and rank correlation.

References:

1. V. Rajaraman: Computer Oriented Numerical Methods, Prentice Hall of India Private Ltd., New Delhi.
2. B.S. Grewal, Numerical Methods for Engineering, Sultan Chand Publication.
3. V. Rajaraman: Computer Oriented Numerical Methods, Prentice Hall of India Private Ltd., New Delhi.
4. S.P Gupta, Statistical Methods, Sultan Chand & Sons Publications.

Course Outcomes:

On completion of this course students will able to:

CO-1.	Demonstrate understanding of common numerical methods and how they are used to obtain approximate solutions.
CO-2.	Apply various numerical methods to find solution of algebraic and transcendental non-linear equations and also solve system of linear equations numerically using direct and iterative methods.
CO-3.	Understand the methods to construct interpolating polynomials and finite difference concepts (forward, backward, divided and central difference) for prediction and also find integration to find area under curve.
CO-4.	Learn fundamental concepts of statistical and optimization methods.
CO-5.	Understand various measures of central tendency(like mean, median and mode), measures of dispersion(range, mean deviation ,standard deviation), Correlation, and Curve fit.

Bachelor of Computer Applications (Semester – II)

BCSE-1222: COMMUNICATION SKILLS IN ENGLISH

Time: 3 Hours **Max. Marks: 50**
Credit Hours (per week):4 **Theory Marks: 37**
Total Hours:60 **Internal Assessment: 13**

Suggested Pattern of Question Paper:
The question paper will consist of Seven skill–oriented questions from Listening and Speaking Skills. The first 6 Questions carry 5 marks each. The 7th Question carries 7 marks. The questions shall be phrased in a manner that students know clearly what is expected of them. There will be internal choice wherever possible.

i) Making summary/ précis or paraphrasing of an idea of a given passage.
ii) Writing a paragraph of expository or argumentative nature of a given topic.
iii) Interpretation of a given data, chart, diagram etc and making a brief report.
iv) Transcoding (given dialogue to a prose or given prose to dialogue).
v) Draft an Advertisement for a given Product and E-mail Writing.
vi) Do as directed Change of voice Units 42-46 (6X5= 30Marks)
vii) Translation from Vernacular (Punjabi/ Hindi) to English (Isolated Sentences)(1X7 = 7Marks)

Course Objectives:

1.	To develop common understanding between receivers and senders/listener and speaker.
2.	To support speaker and listener to enhance two-way process.
3.	To help speaker to make message concise and clear which is understood by the listener.
4.	To transform a message with a better outcome.

Course Contents:
1. **Listening Skills:** Barriers to listening; effective listening skills; feedback skills, attending telephone calls; note taking.
   Activities:
   a) Listening exercises – Listening to conversation, speech/ lecture and taking notes.
2. **Speaking and Conversational Skills**: Components of a meaningful and easy conversation; understanding the cue and making appropriate responses; forms of polite speech; asking and providing information on general topics, situation based Conversation in English; essentials of Spoken English
   Activities:

a) Conversation; dialogue and speech
b) Oral description or explanation of a common object, situation or concept.
c) Interviews and group discussion

Refereeces:

1. *Murphy's English Grammar* (by Raymond Murphy) CUP
2. Oxford Guide to Effective Writing and Speaking by John Seely.
3. The Written Word by Vandana R Singh, Oxford University Press

Course Outcomes:

CO-1.	To develop healthy relationship among the speaker and listener.
CO-2.	To support the speaker to transfer knowledge, skills and emotion exact to listener.
CO-3.	To let know others what is in our mind.
CO-4.	To create better connections, clarify the doubts precisely and to create a sense of trust with the other person.

Bachelor of Computer Applications (Semester – II)

BHPB-1201:**ਲਾਜ਼ਮੀ ਪੰਜਾਬੀ**

ਸਮਾਂ : 3 ਘੰਟੇ ਕ੍ਰੈਡਿਟ ਪ੍ਰਤੀ ਹਫਤਾ : 04

ਕੁੱਲ ਘੰਟੇ : 60 ਥਿਊਰੀ ਅੰਕ : 37, ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ : 13, ਕੁੱਲ ਅੰਕ : 50

ਅੰਕ-ਵੰਡ ਅਤੇ ਪ੍ਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

- ਸਿਲੇਬਸ ਦੇ ਚਾਰ ਭਾਗ ਹਨ ਪਰ ਪ੍ਰਸ਼ਨ-ਪੱਤਰ ਦੇ ਪੰਜ ਭਾਗ ਹੋਣਗੇ। ਪਹਿਲੇ ਚਾਰ ਭਾਗਾਂ ਵਿਚ 02-02 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰੇਕ ਭਾਗ ਵਿਚੋਂ 01-01 ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਲਾਜ਼ਮੀ ਹੋਵੇਗਾ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ (08) ਅੰਕ ਹੋਣਗੇ। ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਪੰਜਵੇਂ ਭਾਗ ਵਿਚ ਸਾਰੇ ਸਿਲੇਬਸ ਵਿਚੋਂ 01-01 ਅੰਕ ਦੇ ਛੇ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ, ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ 05 ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ ਦੇਣਾ ਲਾਜ਼ਮੀ ਹੋਵੇਗਾ। ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ-ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

ਨੋਟ: ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ 13 ਅੰਕਾਂ ਦੀ ਹੈ, ਜੋ ਕਾਲਜ ਵੱਲੋਂ ਨਿਰਧਾਰਿਤ ਦਿਸ਼ਾ ਨਿਰਦੇਸ਼ਾਂ ਅਨੁਸਾਰ ਥਿਊਰੀ ਅੰਕਾਂ ਤੋਂ ਵੱਖਰੀ ਹੋਵੇਗੀ। ਇਸ ਪੇਪਰ ਦੇ ਕੁੱਲ ਅੰਕ 37+13 = 50 ਹਨ।

ਕੋਰਸ ਦਾ ਉਦੇਸ਼ Course Objective

- ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਸਾਹਿਤਕ ਰੁਚੀਆਂ ਪੈਦਾ ਕਰਨਾ।
- ਆਲੋਚਨਾਤਮਕ ਰੁਚੀਆਂ ਨੂੰ ਵਿਕਸਤ ਕਰਨਾ।
- ਭਾਸ਼ਾਈ ਗਿਆਨ ਵਿਚ ਵਾਧਾ ਕਰਨਾ।

ਪਾਠ-ਕ੍ਰਮ ਨਤੀਜੇ Course Outcomes (COs)

- ਵਿਦਿਆਰਥੀ ਦੀ ਸੋਚ-ਸਮਝ ਵਿਕਸਤ ਹੋਵੇਗੀ।
- ਉਸ ਅੰਦਰ ਸਾਹਿਤਕ ਰੁਚੀਆਂ ਪ੍ਰਫਲਿੱਤ ਹੋਣਗੀਆਂ।
- ਉਸ ਅੰਦਰ ਸਾਹਿਤ ਸਿਰਜਣਾ ਦੀ ਸੰਭਾਵਨਾ ਵਧੇਗੀ।
- ਉਹ ਸੰਬੰਧਿਤ ਵਿਸ਼ੇ ਦਾ ਗਹਿਨ ਅਧਿਐਨ ਕਰਨ ਦੇ ਸੁਯੋਗ ਹੋਵੇਗਾ।
- ਉਹ ਭਾਸ਼ਾਈ ਬਣਤਰ ਤੋਂ ਜਾਣੂ ਹੋਵੇਗਾ।

ਪਾਠ-ਕ੍ਰਮ

ਭਾਗ-ਪਹਿਲਾ

ਸਾਹਿਤ ਦੇ ਰੰਗ, ਡਾ. ਮਹਿਲ ਸਿੰਘ (ਸੰਪਾ.), ਰਵੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।

ਭਾਗ ਦੂਜਾ - ਵਾਰਤਕ ਅਤੇ ਰੇਖਾ-ਚਿੱਤਰ, ਡਾ. ਪਰਮਿੰਦਰ ਸਿੰਘ, ਡਾ. ਭੁਪਿੰਦਰ ਸਿੰਘ ਅਤੇ ਡਾ. ਕੁਲਦੀਪ ਸਿੰਘ ਢਿੱਲੋਂ (ਸਹਿ ਸੰਪਾ.)

(ਵਾਰਤਕ ਭਾਗ ਵਿਚੋਂ ਸਾਰ/ਵਿਸ਼ਾ-ਵਸਤੂ। ਰੇਖਾ-ਚਿੱਤਰ ਭਾਗ ਵਿਚੋਂ ਸਾਰ/ਨਾਇਕ ਬਿੰਬ)

ਭਾਗ-ਦੂਜਾ

ਇਤਿਹਾਸਿਕ ਯਾਦਾਂ

ਸ. ਸ. ਅਮੋਲ (ਸੰਪਾ.), ਪੰਜਾਬੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।

(ਨਿਬੰਧ 7 ਤੋਂ 12 ਤਕ ਸਾਰ/ ਵਿਸ਼ਾ-ਵਸਤੂ/ਸ਼ੈਲੀ)

ਭਾਗ-ਤੀਜਾ

(ੳ) ਦਫ਼ਤਰੀ ਚਿੱਠੀ ਪੱਤਰ

(ਅ) ਮੁਹਾਵਰੇ ਅਤੇ ਅਖਾਣ

ਭਾਗ-ਚੌਥਾ

(ੳ) ਸ਼ਬਦ-ਬਣਤਰ ਅਤੇ ਸ਼ਬਦ-ਰਚਨਾ - ਪਰਿਭਾਸ਼ਾ ਅਤੇ ਮੁੱਢਲੇ ਸੰਕਲਪ

(ਅ) ਸ਼ਬਦ-ਸ਼੍ਰੇਣੀਆਂ

Bachelor of Computer Applications (Semester – II)

BPBI-1202: **ਮੁਢਲੀ ਪੰਜਾਬੀ**
(In Lieu of Compulsory Punjabi)

ਸਮਾਂ : 3 ਘੰਟੇ ਕ੍ਰੈਡਿਟ ਪ੍ਰਤੀ ਹਫਤਾ : 04
ਕੁੱਲ ਘੰਟੇ : 60 ਥਿਊਰੀ ਅੰਕ : 37, ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ : 13, ਕੁੱਲ ਅੰਕ : 50

ਅੰਕ-ਵੰਡ ਅਤੇ ਪ੍ਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

- ਭਾਗ ਪਹਿਲਾ ਵਿਚੋਂ ਚਾਰ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਤਿੰਨ ਪ੍ਰਸ਼ਨਾਂ ਦਾ ਉੱਤਰ ਦੇਣਾ ਲਾਜ਼ਮੀ ਹੈ। ਹਰ ਪ੍ਰਸ਼ਨ ਦੇ ਚਾਰ-ਚਾਰ ਅੰਕ ਹਨ। ਭਾਗ ਦੂਸਰਾ ਵਿਚੋਂ ਦੋ-ਦੋ ਅੰਕ ਦੇ ਪੰਜ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਸਾਰੇ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹਨ। ਭਾਗ ਤੀਸਰਾ ਵਿਚੋਂ ਚਾਰ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਲਾਜ਼ਮੀ ਹਨ। ਭਾਗ ਚੌਥਾ ਵਿਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨਾ ਹੋਵੇਗਾ।

ਨੋਟ: ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ 13 ਅੰਕਾਂ ਦੀ ਹੈ, ਜੋ ਕਾਲਜ ਵੱਲੋਂ ਨਿਰਧਾਰਿਤ ਦਿਸ਼ਾ ਨਿਰਦੇਸ਼ਾਂ ਅਨੁਸਾਰ ਥਿਊਰੀ ਅੰਕਾਂ ਤੋਂ ਵੱਖਰੀ ਹੋਵੇਗੀ। ਇਸ ਪੇਪਰ ਦੇ ਕੁਲ ਅੰਕ 37+13 = 50 ਹਨ।

ਕੋਰਸ ਦਾ ਉਦੇਸ਼ Course Objective

- ਵਿਦਿਆਰਥੀ ਅੰਦਰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੀ ਸਮਝ ਵਿਕਸਤ ਕਰਨਾ।
- ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੇ ਵਿਆਕਰਨਕ ਪ੍ਰਬੰਧ ਸੰਬੰਧੀ ਗਿਆਨ ਕਰਾਉਣਾ।
- ਸਿਖਲਾਈ ਤੇ ਅਭਿਆਸ ਦੁਆਰਾ ਪੰਜਾਬੀ ਭਾਸ਼ਾ 'ਤੇ ਪਕੜ ਵਧਾਉਣਾ।

ਪਾਠ-ਕ੍ਰਮ ਨਤੀਜੇ Course Outcomes (COs)

- ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ ਬਾਰੇ ਸਮਝ ਹੋਰ ਵਿਕਸਿਤ ਹੋਵੇਗੀ।
- ਉਹ ਪੰਜਾਬੀ ਸ਼ਬਦ-ਬਣਤਰ ਦੀ ਜਾਣਕਾਰੀ ਹਾਸਿਲ ਕਰਕੇ ਭਾਸ਼ਾਈ ਗਿਆਨ ਨੂੰ ਵਿਕਸਿਤ ਕਰਨਗੇ।
- ਪੰਜਾਬੀ ਸ਼ਬਦ-ਰਚਨਾ ਸੰਬੰਧੀ ਜਾਣਕਾਰੀ ਉਨ੍ਹਾਂ ਦੇ ਗਿਆਨ ਵਿਚ ਵਾਧਾ ਕਰੇਗੀ।

ਪਾਠ-ਕ੍ਰਮ

ਭਾਗ-ਪਹਿਲਾ

ਪੰਜਾਬੀ ਸ਼ਬਦ-ਬਣਤਰ : ਧਾਤੂ, ਵਧੇਤਰ (ਅਗੇਤਰ, ਮਧੇਤਰ, ਪਿਛੇਤਰ), ਪੰਜਾਬੀ ਕੋਸ਼ਗਤ ਸ਼ਬਦ ਅਤੇ ਵਿਆਕਰਨਕ ਸ਼ਬਦ

ਭਾਗ-ਦੂਜਾ

ਪੰਜਾਬੀ ਸ਼ਬਦ-ਪ੍ਰਕਾਰ : (ੳ) ਸੰਯੁਕਤ ਸ਼ਬਦ, ਸਮਾਸੀ ਸ਼ਬਦ, ਦੋਜਾਤੀ ਸ਼ਬਦ, ਦੋਹਰੇ/ਦੁਹਰੁਕਤੀ ਸ਼ਬਦ ਅਤੇ ਮਿਸ਼ਰਤ ਸ਼ਬਦ

(ਅ) ਸਿਖਲਾਈ ਤੇ ਅਭਿਆਸ

ਭਾਗ-ਤੀਜਾ

ਪੰਜਾਬੀ ਸ਼ਬਦ-ਰਚਨਾ :

ਇਕ-ਵਚਨ/ਬਹੁ-ਵਚਨ, ਲਿੰਗ-ਪੁਲਿੰਗ, ਬਹੁਅਰਥਕ ਸ਼ਬਦ, ਸਮਾਨਅਰਥਕ ਸ਼ਬਦ, ਬਹੁਤੇ ਸ਼ਬਦਾਂ ਲਈ ਇਕ ਸ਼ਬਦ, ਸ਼ਬਦ ਜੁੱਟ, ਵਿਰੋਧਅਰਥਕ ਸ਼ਬਦ, ਸਮਨਾਮੀ ਸ਼ਬਦ

ਭਾਗ-ਚੌਥਾ

ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ

ਖਾਣ-ਪੀਣ, ਸਾਕਾਦਾਰੀ, ਰੁੱਤਾਂ, ਮਹੀਨਿਆਂ, ਗਿਣਤੀ, ਮੌਸਮ, ਬਾਜ਼ਾਰ, ਵਪਾਰ, ਧੰਦਿਆਂ ਨਾਲ ਸੰਬੰਧਿਤ

Bachelor of Computer Applications (Semester – II)

BPHC-1204: PUNJAB HISTORY & CULTURE (C 321 TO 1000 A.D.)
(Special Paper in lieu of Punjabi compulsory)
(For those students who are not domicile of Punjab)

Time: 3 Hours **Total. Marks: 50**
Credit Hours(per week): 04 **Theory: 37**
Total Hours:60 **Internal Assessment: 13**

Instructions for the Paper Setter:
The question paper consists of five units: I, II, III, IV and V. Units I, II, III and IV will have two questions each. Each question carries 8 marks. The students are to attempt one question from each unit approximately in 800 words. Unit-V consists of 7 short answer type questions to be set from the entire syllabus. Students are to attempt any 5 questions in about 20 words each. Each questioncarries 1 mark.

Note: The examiner is to set the question paper in two languages: English & Hindi.

Course Objectives:

1.	The main objective of this course is to educate the students who are not domicile of the Punjab about the history and culture of the Ancient Punjab.
2.	It is to provide them knowledge about the social, economic, religious, cultural and political life of the peopleof the Punjab during the rule of various dynasties such as The Mauryans, The Khushans, The Guptas, The Vardhanas and other ancient ruling dynasties of the period under study.

UNIT-I

1. Punjab under Chandragupta Maurya and Ashoka.
2. The Kushans and their Contribution to the Punjab.

UNIT-II

3. The Punjab under the Gupta Emperors.
4. The Punjab under the Vardhana Emperors

UNIT-III

5. Political Developments 7th Century to 1000 A.D.
6. Socio-cultural History of Punjab from 7th Century to 1000 A.D.

UNIT-IV

7. Development of languages and Literature.
8. Development of art & Architecture.

References: -

1. L. Joshi (ed), History and Culture of the Punjab, Part-I, Patiala, 1989 (3rd edition)
2. L.M. Joshi and Fauja Singh (ed), History of Punjab, Vol.I, Patiala 1977.
3. Budha Parkash, Glimpses of Ancient Punjab, Patiala, 1983.

4. B.N. Sharma, Life in Northern India, Delhi. 1966.

Course Outcomes:

After completion of the course, the students will be able to learn:

CO-1	The history and culture of the Punjab in Ancient Period.
CO-2	Social, economic, religious, cultural and political life of Ancient Indian dynasties.
CO-3	Political developments from 7th century to1000AD.
CO-4	Socio-cultural history of the Punjab from 7th century to1000AD.
CO-5	Language, literature, art and architecture of Ancient Punjab.

Bachelor of Computer Applications (Semester – II)

BCA-124P: Practical–I (C++ Programming Language)

Credit Hours (per week):8 **Total Marks: 75**
Total Hours:120 **Practical Marks: 56**
Practical Internal Assessment M: 19

Course Objectives:

The learning objectives of this course are:

1.	To understand how C++ improves C with object-oriented features.
2.	To learn how containment and inheritance promote code reuse in C++.
3.	To learn how inheritance and virtual functions implement dynamic binding with polymorphism.
4.	To learn how to design C++ classes for code reuse.
5.	Apply various numerical methods to find solution of algebraic and transcendental non-linear equations and also solve system of linear equations numerically using direct and iterative methods.

Operational Knowledge and Implementation of Numerical Methods & Statistical techniques using C++.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Apply the concepts of object-oriented programming.
CO-2.	Understand the process of data file manipulations using C++.
CO-3.	Understand and implement various concepts of numerical and statistical methods to solve real life problems. Describe the object-oriented programming approach in connection with C++.
CO-4.	Apply virtual and pure virtual function & complex programming situations.

Bachelor of Computer Applications (Semester – II)

Course Code: ZDA121
Course Title-DRUG ABUSE: PROBLEM, MANAGEMENT AND PREVENTION
DRUG ABUSE: MANAGEMENT AND PREVENTION
(Compulsory for all Under Graduate Classes)

Credit Hours (per week): 1.5 hrs.
Total Hours: 22.5 hrs.
Max. Marks: 50

Instructions for the Paper Setters:

Section–A: (15 Marks): It will consist of five short answer type questions. Candidates will be required to attempt three questions, each question carrying 05 marks. Answer to any of the questions should not exceed two pages.

Section–B: (20 Marks) It will consist of four essay type questions. Candidates will be required to attempt two questions, each question carrying 10 marks. Answer to any of the questions should not exceed four pages.

Section–C: (15 Marks) It will consist of two questions. Candidate will be required to attempt one question only. Answer to the question should not exceed 5 pages.

Course Objectives:

The course aim is to

CO-1.	Describe the role of family in the prevention of drug abuse.
CO-2.	Describe the role of school and teachers in the prevention of drug abuse.
CO-3.	Emphasize the role of media and educational and awareness program.
CO-4.	Provide knowhow about various legislation and Acts against drug abuse.

UNIT-I

- **Prevention of Drug abuse**

Role of family: Parent child relationship, Family support, Supervision, Shaping values, Active scrutiny.

UNIT-II

- **School:** Counseling, Teacher as role-model, Parent-Teacher-Health Professional Coordination, Random testing on students.

UNIT-III

- **Controlling Drug Abuse**

Media: Restraint on advertisements of drugs, advertisements on bad effects of drugs, Publicity and media, Campaigns against drug abuse, Educational and Awareness Program

UNIT-IV

- **Legislation:** NDPS Act, Statutory warnings, Policing of Borders, Checking Supply/Smuggling of Drugs, Strict enforcement of laws, Time bound trials.

References:

1. Extent, Pattern and Trend of Drug Use in India, Ministry of Social Justice and Empowerment, Government of India, 2004.
2. Gandotra, R. and Randhawa, J.K. 2018. ਡਰੱਗਜ਼ ਦੁਰਵਰਤੋਂ (ਨਸ਼ਾਖੋਰੀ) ਪ੍ਰਬੰਧਨ ਅਤ ਰੋਕਥਾਮ। Kasturi Lal & Sons, Educational Publishers, Amritsar- Jalandhar.
3. Inciardi, J.A. 1981. The Drug Crime Connection. Beverly Hills: Sage Publications.
4. Modi, Ishwar and Modi, Shalini (1997) Drugs: Addiction and Prevention, Jaipur: Rawat Publication.
5. Randhawa, J.K. and Randhawa, Samreet 2018. Drug Abuse-Management and Prevention. Kasturi Lal & Sons, Educational Publishers, Amritsar- Jalandhar.
6. Sain, Bhim 1991, Drug Addiction Alcoholism, Smoking obscenity New Delhi: Mittal Publications.
7. Sandhu, Ranvinder Singh, 2009, Drug Addiction in Punjab: A Sociological Study. Amritsar: Guru Nanak Dev University.
8. Singh, Chandra Paul 2000. Alcohol and Dependence among Industrial Workers: Delhi: Shipra. 9. World Drug Report 2011, United Nations office of Drug and Crime.
10. World Drug Report 2010, United Nations office of Drug and Crime

Course Outcomes:

The students will be able to:

CO-1.	Understand the importance of family and its role in drug abuse prevention.
CO-2.	Understand the role of support system especially in schools and inter-relationships between students, parents and teachers.
CO-3.	Understand impact of media on substance abuse prevention.
CO-4.	Understand the role of awareness drives, campaigns etc. in drug abuse management.
CO-5	Learn about the Legislations and Acts governing drug trafficking and Abuse in India.

Bachelor of Computer Applications

Semester – III

Sr. No.	Paper Code	Paper Name	Marks				Page. No.
			Theory	Internal Assessment	Practical	Total	
1	BCA-231	Computer Architecture	56	19	-	75	146-147
2	BCA-232	Database Management System	56	19	-	75	148-149
3	BCA-233	Computational Problem Solving Using Python	56	19	-	75	150-151
4	ESL–221	*Environmental Studies – I (Compulsory)	37	13	-	50	152-154
5	BCA-234P	Programming Lab I – Python	-	13	37	50	155
6	BCA-235P	Programming Lab II – Oracle	-	07	18	25	156

*** Marks of Paper EVS will not be included in Grand Total.**

Bachelor of Computer Applications (Semester – III)

BCA-231: Computer Architecture

Time: 3 Hours **M. Marks: 75**
Credit Hours (per week):4 **Theory Marks: 56**
Total Hours:60 **Theory Internal Assessment Marks: 19**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks**.

Course Objectives:
Students will try to learn:

1.	Conceptualize the basics of organizational and architectural issues of a digital computer.
2.	Analyze processor performance improvement using instruction level parallelism.
3.	Study various data transfer techniques in digital computer.
4.	Articulate design issues in the development of processor or other components that satisfy design requirements and objectives.

UNIT-I

Information Representation: Register Transfer, Various Registers, Implementing Common Bus Using Multiplexers: Logical; Arithmetic & Shift Micro – operations.
Basic Computer Design Instruction Codes, Interfacing various Registers, Computer Instructions, Timing Signals, Instruction Cycle, Design of a Basic Computer.
CPU Design Stack Organized CPU, Instruction Formats, Addressing Modes.

UNIT-II

CPU Design Program Control, Hardwired & Microprogrammed (Wilhe's Design) Control Unit.
Memory Organization Memory Hierarchy, Designs & Concepts of Main Memory, Auxiliary Memory, Associative Memory, Cache and Virtual Memory.
I/O Organization I/O Interface, Modes of Transfer, Program Interrupt, DMA & I/O Processor.

Pipeline & Vector Processing Parallel Processing Pipelining, Parallel & Distributed Computers, SISD, SIMD & MISD, MIMD Machines, Vector Processing.

References:

1.Computer System Architecture: M.M. Mano (PHI).
2.Computer Architecture: J.P. Hayes.
3.Computer Architecture: Patterson & Hemessy.
4.Computer Organization and Architecture by William Stallings.
5. Computer Systems Design and Architecture "by Vincent P Heuring and Harry F Jordan.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Understand the basic organization of computer.
CO-2.	Demonstrate control unit operations and conceptualize instruction level parallelism.
CO-3.	Demonstrate and perform computer arithmetic operations.
CO-4.	Categorize memory organization and explain the function of each element of a memory hierarchy.
CO-5.	Identify and compare different methods for computer I/O mechanisms.

Bachelor of Computer Applications (Semester – III)

BCA-232: Database Management System

Time: 3 Hours **M. Marks: 75**
Credit Hours (Per Week): **Theory Marks: 56**
Theory Internal Assessment Marks: 19

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks.**

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks**.

Course Objectives:

1.	To get acquaint students with the basics of DBMS, different Architectural Models for DBMS, Normalization of data, Concurrency control problems and its management, Protection, Security and recovery aspects of databases along with practical knowledge of databases using SQL and PL/SQL.
2.	The key goal is to prepare students for a professional career in the field of data administration and database design.
3.	To get acquaint students with basics of database security and administration.
4.	To get acquaint students with good knowledge of DBMS. During the course, students will learn about database design and database handling activities.

UNIT-I

Introduction to Data, Field, Record, File, Database, Database management system. Structure of database system, Advantage and disadvantage, levels of database system, Relational model, hierarchical model, network model, comparison of these models, E–R diagram, different keys used in a relational system, SQL.

DBA, responsibilities of DBA, Relational form like INF, 2NF, 3NF, BCNF, 4^{th} NF, 5^{th} NF, DBTG.

UNIT-II

Concurrency control and its management, protection, security, recovery of database.

SQL: Introduction to SQL–DDL, DML, DCL, Join methods & sub query, Union Intersection, Minus, Tree Walking, Built in Functions, Views, Security amongst users, Sequences, Indexing Cursors–Implicit & Explicit, Procedures, Functions & Packages Database Triggers.

Big Data: Introduction to Big Data and Analytics, Introduction to NoSQL

Introductory knowledge and classification of NoSQL databases based upon Column (HBase), Document (MongoDB), Keyvalue (Oracle NoSQL database), Graph, Multimodel and their query languages.

References:

1. Introduction to Database System By C.J. Date.
2. Database Management System By B.C. Desai.
3. Database Concept by Korth.
4. Simplified Approach to DBMS– Kalyani Publishers
5. Oracle – Developer – 2000 by Ivan Bayross.
6. Database System concepts & Oracle (SQL/PLSQ) – AP Publishers.
7. https://www.mongodb.com/nosql-explained
8. Introduction to NoSQL (Ebook), NoSQL Seminar 2012 @ TUT, Arto Salminen

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Understand Databases , their design and development
CO-2.	Develop intellectual Cognitive/ analytical skills: Normalization of Databases.
CO-3.	Gain practical Skills Using SQL and PL/SQL.
CO-4.	Gain transferable skills: Usage of DBMS design and administration.

Bachelor of Computer Applications (Semester – III)

BCA-233: Computational Problem Solving Using Python

Time: 3 Hours **M. Marks: 75**
Credit Hours (per week):4 **Theory Marks: 56**
Total Hours:60 **Theory Internal Assessment Marks: 19**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks**.

Course Objectives:

1.	Build basic programs using fundamental programming constructs like variables, conditional logic, looping, and functions
2.	Work with user input to create fun and interactive programs
3.	Create simple games with images, animations, and audio using our custom beginner-friendly programming library.

UNIT-I

Introduction to Python: Process of Computational Problem Solving, Python Programming Language
Data and Expressions: Literals, Variables and Identifiers, Operators, Expressions, Statements and Data Types
Control Structures: Boolean Expressions (Conditions), Logical Operators, Selection Control, Nested conditions, Debugging
Lists: List Structures, Lists (Sequences) in Python, Iterating Over Lists (Sequences) in Python
Functions: Fundamental Concepts, Program Routines, Flow of Execution, Parameters & Arguments
Iteration: While statement, Definite loops using For, Loop Patterns, Recursive Functions, Recursive Problem Solving, Iteration vs. Recursion

UNIT-II

Dictionaries: Dictionaries and Files, Looping and dictionaries, Advanced text parsing
Files: Opening Files, Using Text Files, String Processing, Exception Handling

Objects and Their Use: Introduction to Object Oriented Programming
Modular Design: Modules, Top-Down Design, Python Modules
Using Databases and SQL: Database Concepts, SQLite Manager Firefox Add-on, SQL basic summary, Basic Data modeling, Programming with multiple tables.

References:

1. Python for Informatics, Charles Severance, version 0.0.7
2. Introduction to Computer Science Using Python: A Computational Problem-Solving Focus, Charles Dierbach, Wiley Publications, 2012, ISBN : 978-0-470-91204-1
3. Introduction To Computation And Programming Using Python, GUTTAG JOHN V, PHI, 2014, ISBN-13: 978-8120348660
4. Introduction to Computating& Problem Solving Through Python, Jeeva Jose andSojan P. Lal,Khanna Publishers, 2015, ISBN-13: 978-9382609810
5. Introduction to Computing and Programming in Python, Mark J. Guzdial, Pearson Education, 2015, ISBN-13: 978-9332556591
6. Fundamentals of Python by Kenneth Lambert, Course Technology, Cengage Learning , 2015
7. Learning Python by Mark Lutz, 5th Edition, O'Reilly Media, 2013

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Build basic programs using fundamental programming constructs like variables, conditional logic, looping, and functions.
CO-2.	Work with user input to create fun and interactive programs
CO-3.	Define and demonstrate the use of built-in data structures “lists” and “dictionary”
CO-4.	Design and implement program to solve real world problem.
CO-5.	Design and implement GUI application and learn how to handle exceptions and files.
CO-6.	Make database connectivity in python programming language.

Bachelor of Computer Applications
SEMESTER–III
Course code: ESL–221
Course Title: ENVIRONMENTAL STUDIES–I (COMPULSORY)

Credit Hours (Per Week): 2
Total Hours: 30
Maximum Marks: 50 Marks

Instructions for Paper Setters: The question paper will consist of three sections. Candidate will be required to attempt all the sections. Each unit of the syllabus should be given equal weightage of marks. Paper to be set in English, Punjabi and Hindi.
Section–A: (16 Marks): It will consist of five short answer type questions. Candidates will be required to attempt four questions, each question carrying four marks. Answer to any of the questions should not exceed two pages.
Section–B: (24 Marks): It will consist of five questions. Candidates will be required to attempt four questions, each question carrying six marks. Answer to any of the questions should not exceed four pages.
Section–C: (10 Marks): It will consist of two questions. Candidate will be required to attempt one question (carrying ten marks) only. Answer to the question should not exceed 5 pages.

Course Objectives

CO-1	The main goal of Environmental studies is to create the environmental awareness to create a safe, green and sustainable environment.
CO-2	To make students aware about the importance of ecosystem, types of ecosystem, energy flow in an ecosystem, ecological succession, food chain and food web.
CO-3	To make students aware of water conservation, global warming, consumerism and waste products. and, also about the environmental protection acts.
CO-4	Role of National Service Scheme (NSS). Health and hygiene.

UNIT-I

The Multidisciplinary Nature of Environmental Studies:

- Definition, scope & its importance.
- Need for public awareness.

Natural Resources:

- Natural resources and associated problems:

a) Forest Resources: Use of over exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
b) Water Resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.

c) Mineral Resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

d) Food Resources: World food problems, change caused by agriculture and overgrazing, effects or modern agriculture, fertilizer-pesticide problem, salinity, case studies.

e) Energy Resources: Growing of energy needs, renewable and non-renewable energy resources, use of alternate energy sources, case studies.

i) **f) Land Resources**: Land as a resource, land degradation, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

UNIT-II

Ecosystem:

- Concept of an ecosystem.
- Structure and function of an ecosystem.
- Producers, consumers and decomposers.
- Energy flow in the ecosystem.
- Ecological succession.
- Food chains, food webs and ecological pyramids.

Introduction, types, characteristic features, structure and function of the following ecosystems:

a. Forest ecosystem

b. Grassland ecosystem

c. Desert ecosystem

d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

UNIT-III

Social Issues and Environment:

From unsustainable to sustainable development.

Urban problems related to energy.

Water conservation, rain water harvesting, watershed management.

Resettlement and rehabilitation of people; its problems and concerns. Case studies.

Environmental ethics: Issues and possible solutions.

Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocause. Case studies.

Wasteland reclamation.

Consumerism and waste products.

Environmental Protection Act:

- Air (prevention and Control of Pollution) Act.
- Water (prevention and Control of Pollution) Act.
- Wildlife Protection Act.
- Forest Conservation Act.

Issues involved in enforcement of environmental legislation.

Public awareness.

UNIT-IV

National Service Scheme

- **Introduction and Basic Concepts of NSS:** History, philosophy, aims & objectives of NSS; Emblem, flag, motto, song, badge etc.; Organizational structure, roles and responsibilities of various NSS functionaries.
- **Health, Hygiene & Sanitation:** Definition, needs and scope of health education; Food and Nutrition; Safe drinking water, water borne diseases and sanitation (Swachh Bharat Abhiyan); National Health Programme; Reproductive health.

References/Books:

1. Agarwal, K. C. 2001. Environmental Biology, Nidhi Publications Ltd. Bikaner.
2. Bharucha, E. 2005. Textbook of Environmental Studies, Universities Press, Hyderabad.
3. Down to Earth, Centre for Science and Environment, New Delhi.
4. Jadhav, H. & Bhosale, V. M. 1995. Environmental Protection and Laws. Himalaya Pub.
5. Joseph, K. and Nagendran, R. 2004. Essentials of Environmental Studies, Pearson Education (Singapore) Pte. Ltd., Delhi.
6. Kaushik, A. & Kaushik, C. P. 2004. Perspective in Environmental Studies, New Age International (P) Ltd, New Delhi.
7. Miller, T. G. Jr. 2000. Environmental Science, Wadsworth Publishing Co.
8. Sharma, P. D. 2005. Ecology and Environment, Rastogi Publications, Meerut.
9. Booklet on Safe Driving. Sukhmani Society (Suvidha Centre), District Court Complex, Amritsar
10. Kanta, S., 2012. Essentials of Environmental Studies, ABS Publications, Jalandhar.

Course Outcomes

On Completing the course, the students will be able to:

CO-1	To learn about the sustainable environment.
CO-2	To gain the knowledge ecosystem and its functioning.
CO-3	To know about the water conservation programs like rain water harvesting and water shedding. and, to gain knowledge of environmental (air, water and pollution) protections acts.
CO-4	To know about the role and importance of NSS– a volunteer organization, in making up a better environment and to maintain better health and hygiene.

Bachelor of Computer Applications (Semester - III)

Paper BCA-234P

Programming Lab I –Python

Credit Hours (Per Week):4
Total Hours:60 **M. Marks: 50**
Practical Marks: 37
Practical Internal Assessment Marks: 13

Course Objectives:

1.	Build basic programs using fundamental programming constructs like variables, conditional logic, looping, and functions
2.	Work with user input to create fun and interactive programs
3.	Create simple games with images, animations, and audio using our custom beginner-friendly programming library.

Lab – I: Based on Python

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Build basic programs using fundamental programming constructs like variables, conditional logic, looping, and functions.
CO-2.	Work with user input to create fun and interactive programs
CO-3.	Define and demonstrate the use of built-in data structures “lists” and “dictionary”
CO-4.	Design and implement a program to solve a real-world problem.
CO-5.	Design and implement GUI application and how to handle exceptions and files.
CO-6.	Make database connectivity in python programming language.

Bachelor of Computer Applications (Semester - III)

BCA-235P

Programming Lab II – Oracle

Credit Hours (per week):4
Total Hours:60 **M. Marks: 25**
Practical Marks: 18
Practical Internal Assessment Marks: 07

Course Objectives:

1.	Enhance the knowledge and understanding of Database analysis and design. Enhance the knowledge of the processes of Database Development and Administration using SQL and PL/SQL.
2.	Enhance Programming skills and techniques using SQL and PL/SQL.
3.	Develop efficient PL/SQL programs to access Oracle databases.
4.	Design modular applications using packages.
5.	Invoke native dynamic SQL to build runtime SQL statements.
6.	Manage data retrieval with cursors and cursor variables.
7.	Enhance performance using collection data types and bulk operations.
8.	Create triggers to solve business challenges and enforce business rules.

Lab – II: Practical in Oracle

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Use the Relational model and how it is supported by SQL and PL/SQL.
CO-2.	Use the PL/SQL code constructs of IF-THEN-ELSE and LOOP types as well as syntax and command functions.
CO-3.	Solve Database problems using Oracle: SQL and PL/SQL. This will include the use of Procedures, Functions, Packages, and Triggers.

Bachelor of Computer Applications

Semester – IV

Sr. No.	Paper No.	Paper	Marks				Page No.
			Theory	Internal Assessment	Practical	Total	
1	BCA-241	Data Structures & File Processing	56	19	-	75	158-159
2	BCA-242	Information Technology	56	19	-	75	160-161
3	BCA-243	Distributed Computing	56	19	-	75	162-163
4	BCA-244	System Software	56	19	-	75	164-165
5	ESL–222	* Environmental Studies – II (Compulsory)	37	13	-	50	166-168
6	BCA-245P	Lab I– (Data Structures implementation using C++)	-	13	37	50	169
7	BCA-246P	Lab II– (Distributed Computing)	-	13	37	50	170

Note:

1. All the students are required to undergo 'Industrial Training' for 6 weeks in IT Companies after 4th semester final examinations. Final degree to the students will be awarded subject to their successfully completing the 'Industrial Training'.
2. 'Industrial Training' will be evaluated as satisfactory / unsatisfactory internally by the department.
3. Last date for submission of training Report within 1 Week after coming from training.
4. Marks of Paper EVS will not be included in Grand Total.

Bachelor of Computer Applications (Semester - IV)

BCA-241: Data Structures and File Processing

Time: 3 Hours **M. Marks: 75**
Credit Hours (per week):4 **Theory Marks: 56**
Total Hours:60 **Theory Internal Assessment Marks: 19**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks**.

Course Objectives:

1.	The main objective of this course is to help students to understand the concept of organizing and managing data in computer's memory.
2.	Therefore, this course introduces different data structure techniques along with their representation in computer's memory.

UNIT-I

Basic Data Structure: Introduction to elementary Data Organization, Common Operation on Data Structures, Algorithm Complexity, Big O Notation, Time – Space tradeoff between Algorithms.
Arrays: Array Defined, Representing Arrays in Memory, Various Operations on Linear Arrays, Multidimensional Arrays.
Searching Techniques: Linear and Binary Search.
Linked Lists: Types of Linked Lists, Representing Linked Lists in Memory, Advantages of using Linked Lists over Arrays, Various Operations on Linked Lists.
Stacks: Description of STACK structure, Implementation of Stack using Arrays and Linked Lists, Applications of Stacks – Converting Arithmetic expression from infix notation to polish and their subsequent evaluation, Quick sort Technique to sort an array.

UNIT-II

Queues: Description of queue structure, Implementation of queue using arrays and linked lists, Description of priorities of queues, Dequeues.
Sorting Techniques: Bubble Sort, Selection Sort, Insertion Sort, Merge Sort, Heap Sort.
Trees: Description of Tree Structure and its Terminology, Binary Trees and Binary Search Trees and their representation in Memory, Heap Sort.

Graphs: Description of Graph Structure, Implement Graphs in Memory using Adjacency Matrix, Path Matrix.
File Organization: Concept of field, record, file, blocking and compaction.
File Organization Techniques: Sequential, indexed, indexed sequential, Direct, Hashing.
Concept of master and transaction files.

References:

1. Seymour Lipschutz, Theory and Problems of Data Structures, Schaum's Outline Series,McGraw Hill Company.
2. Tanenbaum, Data Structure using C.
3. Data Structure and Algorithms by Alfred V. John E. Hopcroft, Jeffery D. Ullman Pearson.
4. Sorenson and Trembley, "An Introduction to Data Structure with Applications, McGraw Hill, 2006 edition.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Understand the concept of algorithm complexity and acquire knowledge on the mathematical notations which can be used to measure the algorithm's complexity.
CO-2.	Comprehend different data structure techniques such as array, stacks and queue.
CO-3.	Apply linear search and binary search techniques in real word applications to identify the particular element.
CO-4.	Get knowledge on different sorting algorithms along with their time complexities.
CO-5.	Understand the list, trees, and graphs along with the operations performed on them.
CO-6.	Understand the memory representation of the above mentioned data structures.

Bachelor of Computer Applications (Semester - IV)
BCA-242: Information Technology

Time: 3 Hours **M. Marks: 75**
Credit Hours (per week):4 **Theory Marks: 56**
Total Hours:60 **Theory Internal Assessment Marks: 19**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks**.

Course Objectives:

1.	It aims at acquainting students better with the essentials of Information, system and management. It encompasses study of Information Systems (IS), its functions, types and categories, and SDLC mainly.
2.	Career prospectus after completion of course of study are as Data and Information manager, Data administrator, Data analyst, Information Officer, Application analyst, IT consultant, IT technical support officer and allied jobs.
3.	Further knowledge of Information management systems software and strong programming skills are essential for achieving heights in this field.
4.	The key goal is to prepare students for a professional career in the field of data Administration Data analysis, as Information Officer, Application analyst, etc.
5.	The primary goal is to prepare students for full knowledge of internet its application and working of internet.
6.	To get good knowledge of internet protocol, working of all protocols.
7.	Also, you can learn how to design web pages in HTML practically.

UNIT-I

Information Systems

Introduction to IT & its components, What is Information systems, Computer based information systems, Management Information System, Decision Support System, Expert System, Functional Information System, Open Information System, Transaction Processing System, System Development Process & System development Tools. Internet basics, Its uses and Applications.
Various types of information systems: Transaction processing systems, office Automation systems, MIS and decision support system.

About internet and its working

Business use of internet, services offered by internet, evolution of internet, internet service provider (ISP), windows environment for dial up networking (connecting to internet), audio on internet, Internet Addressing (DNS and IP addresses).

E–Mail Basic Introduction: Advantage and disadvantage, structure of an e–mail message,working of e–mail (sending and receiving messages), managing e–mail (creating new folder,deleting messages, forwarding messages, filtering messages) Implementation of outlook express.

UNIT-II

Internet Protocol: Introduction, file transfer protocol (FTP), Gopher, Telnet, other protocols like HTTP and TCP/IP.

WWW: Introduction, working of WWW, Web browsing (opening, viewing, saving and printing a web page and bookmark), web designing using HTML, DHTML with programming techniques.

Intranet and Extranet: Introduction, application of intranet, business value of intranet, working of intranet, role of extranet, working of extranet, difference between intranet and extranet.

References:

1 Peter Norton, Introduction to Computers, Glencoe, Macmillan/McGraw Hill. Kroenke, Business Computer System, McGraw Hill.

2 Patric, G.Mckeown, Living with the Computers, 2nd edition, HBT Publishers, USA.

3 Hussain & Hussain, Computer Technology, Applications & Social Implications, PHI.

4."Internet Technologies", S. K. Bansal, APH Publishing Corporation (April 1, 2002).

Course Outcomes

On Completing the course, the students will be able to:

CO-1.	Understand the Software Development Life Cycle (SDLC) development.
CO-2.	Gain intellectual Cognitive/analytical skills: System Analysis and Design
CO-3.	Gain transferable skills: Software requirement specification, S/W Design Tools, SDLC skills Knowledge and Understanding, Intellectual Skills, practical Skills, Transferable skills).
CO-4.	Know how to define internet, www, various protocols and understand the working of internet
CO-5.	Gain intellectual (Cognitive/Analytical) skills which enable them to identify which medium and topology should be used for networking.
CO-6.	Gain practical skills which enable them to create HTML based web pages and create e-mail ids.

Bachelor of Computer Applications (Semester - IV)

BCA-243: Distributed Computing

Time: 3 Hours **M. Marks: 75**
Credit Hours (per week): 4 **Theory Marks: 56**
Total Hours:60 **Theory Internal Assessment Marks: 19**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from UNIT-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks.**

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from UNIT-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks**.

Course Objectives:

1.	Distributed Systems combine the computational power of multiple computers to solve complex problems.
2.	The individual computers in a distributed system are typically spread over broad geographies and possess heterogeneous processor and operating system architectures.
3.	To learn the principles, architectures, algorithms and programming models used in distributed systems.
4.	To examine state-of-the-art distributed systems, such as Google File System.
5.	To design and implement sample distributed systems.

UNIT I

Basic Concepts - Characterization of Distributed Systems, Examples, Resource Sharing, Web Challenges, System Models–,Architectural and Fundamental Models, Networking and Internetworking, Types of Networks, Network Principles , Internet Protocols

Processes and Distributed Objects - Inter–process Communication ,The API for the Internet Protocols ,External Data Representation and Marshalling , Client –Server Communication , Group Communication , Distributed Objects and Remote Invocation – Communication Between Distributed Objects , Remote Procedure Call , Events and Notifications .

UNIT II

Operating System Issues - The OS Layer, Protection, Processes and Threads, Communication and Invocation, OS Architecture, Security Overview, Cryptographic Algorithms, Digital Signatures.

Distributed Transaction Processing - Transactions, Nested Transactions, Locks, Optimistic Concurrency Control, Timestamp Ordering, Comparison of Flat and Nested Distributed Transactions,

Atomic Commit Protocols, Concurrency Control in Distributed Transactions, Distributed Deadlocks, Recovery.

Refereces:

1.George Coulouris, Jean Dollimore and Tim Kindberg, "Distributed Systems Concepts and Design", 3rd Edition, Pearson Education, 2002.

2.Andrew S. Tanenbaum, Maartenvan Steen, Distibuted Systems, "Principles and Pardigms", Pearson Education, 2002.

3.Jennifer Welch Hagit Attiya,"Distributed Computing :Fundamentals, Simulations and Advanced Topics",2nd edition, Wiley,2006.

4.M.L. Liu, "Distributed Computing: Principles and Applications",1st edition, Pearson Education,2004.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Understand the design principles in distributed systems and the architectures for distributed systems.
CO-2.	Apply various distributed algorithms related to clock synchronization, concurrency control, deadlock detection, load balancing, voting.
CO-3.	Analyze fault tolerance and recovery in distributed systems and algorithms for the same.
CO-4.	Analyze the design and functioning of existing distributed systems and file systems and implement different distributed algorithms over currently distributed platforms
CO-5.	Identify the core concepts of distributed systems: how several machines orchestrate to solve problems efficiently, reliable and scalable way correctly.

Bachelor of Computer Applications (Semester - IV)

BCA-244: SYSTEM SOFTWARE

Time: 3 Hours **M. Marks: 75**
Credit Hours (per week):4 **Theory Marks: 56**
Total Hours:60 **Theory Internal Assessment Marks: 19**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Istructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks**.

Course Objective:

1.	To understand the relationship between system software and machine architecture.
2.	To Learn the processing of an HLL program for execution on a computer
3.	To understand the process of scanning and parsing.

UNIT-I

Introduction to System Software
Introduction to System Software and its components
Translators, loaders, interpreters, compiler, assemblers
Assemblers
Overview of assembly process, design of one pass and two assemblers
Macroprocessors
Macro definition and expansion, concatenation of macro parameters, generations of uniquelabels , conditional macro expansion, Recursive macro expansion

UNIT-II

Compilers
Phases of Compilation Process, Lexical Analysis, Parsing, Storage Management Optimization Incremental Compilers, Cross Compilers.
Loaders and Linkage editors
Basic loader functions. Relocation, program linking, linkage, editors, dynamic linking, Bootstrap Loaders.

References:

1. Leland L. Beck: System Software, An Introduction to System Programming, AddisonWesley.
2. D.M. Dhamdhere: Introduction to System Software, Tata McGraw Hill.
3. D.M. Dhamdhere: System Software and Operating System, Tata McGraw Hill, 1992.
4. Madrich, Stuarte: Operating Systems, McGraw Hill, 1974.
5. Stern Nancy Assembler Language Programming for IBM and IBM CompatibleComputers, John Wiley, 1991.

Course Outcome:

On Completing the course, the students will be able to:

CO-1.	Understand the basics of system programs like editors, compiler, assembler, linker, loader, interpreter and debugger.
CO-2.	Describe the various concepts of assemblers and macro processors.
CO-3.	Understand various phases of compiler and compare its working with assembler.
CO-4.	Understand how linker and loader create an executable program from an object module created by assembler and compiler.
CO-5.	Know various editors and debugging techniques.

Bachelor of Computer Applications (Semester - IV)
Course Code: ESL–222
Course Title: ENVIRONMENTAL STUDIES–II (COMPULSORY)

Credit Hours (Per Week): 2
Total Hours: 30
Maximum Marks: 50 Marks

Instructions for Paper Setters: The question paper will consist of three sections. Candidate will be required to attempt all the sections. Each unit of the syllabus should be given equal weightage of marks. Paper to be set in English, Punjabi and Hindi.
Section–A: (16 Marks): It will consist of five short answer type questions. Candidates will be required to attempt four questions, each question carrying four marks. Answer to any of the questions should not exceed two pages.
Section–B: (24 Marks): It will consist of five questions. Candidates will be required to attempt four questions, each question carrying six marks. Answer to any of the questions should not exceed four pages.
Section–C: (10 Marks): It will consist of two questions. Candidate will be required to attempt one question (carrying ten marks) only. Answer to the question should not exceed 5 pages.

Course Objectives

CO-1	To study the concept of Biodiversity – role, importance, values and its conservation. Hot spots and threats to biodiversity.
CO-2	To create awareness regarding environmental pollution, its causes and effects and preventive measure to control the different types of pollution.
CO-3	To make students aware of growing human population – causes and concern. Family welfare programs. Road safety (Traffic) rules.
CO-4	To know about entrepreneurship development and civil/self defense.

UNIT-I

Biodiversity and its Conservation:

- Definition: Genetic, species and ecosystem diversity.
- Biogeographical classification of India.
- Value of Biodiversity: Consumptive use; productive use, social, ethical, aesthetic and option values.
- Biodiversity of global, National and local levels.
- India as mega-diversity nation.
- Hot-spots of biodiversity.
- Threats to Biodiversity: Habitat loss, poaching of wild life, man wildlife conflicts.
- Endangered and endemic species of India.
- Conservation of Biodiversity: In situ and Ex-situ conservation of biodiversity.

UNIT-II

Environmental Pollution:

- Definition, causes, effects and control measures of:
  a) Air Pollution
  b) Water Pollution
  c) Soil Pollution
  d) Marine Pollution
  e) Noise Pollution
  f) Thermal Pollution
  g) Nuclear Hazards
  h) Electronic Waste
- Solid Waste Management: Causes, effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution.
- Pollution case studies.
- Disaster Management: Floods, Earthquake, Cyclone and Landslides.

UNIT-III

Human Population and the Environment

- Population growth, variation among nations.
- Population explosion-Family welfare programme.
- Environment and human health.
- Human rights.
- Value education.
- HIV/AIDS.
- Women and child welfare.
- Role of information technology in environment and human health.
- Case studies.
- Road Safety Rules & Regulations**:** Use of Safety Devices while Driving, Do's and Don'ts while Driving, Role of Citizens or Public Participation, Responsibilities of Public under Motor Vehicle Act, 1988, General Traffic Signs.
- Accident & First Aid**:** First Aid to Road Accident Victims, Calling Patrolling Police & Ambulance.

UNIT-IV

National Service Scheme:

- **Entrepreneurship Development:** Definition & Meaning; Qualities of good entrepreneur; Steps/ ways in opening an enterprise; Role of financial and support service Institutions.
- **Civil/Self Defense:** Civil defense services, aims and objectives of civil defense; Needs for self-defense training.

Field Visits:

- Visit to a local area to document environmental assets–river/forest/grassland/hill/ mountain.

- Visit to a local polluted site–Urban/Rural/Industrial/Agricultural.
- Study of common plants, insects, birds.
- Study of simple ecosystems–pond, river, hill slopes etc.
- Contribution of the student to NSS/any other social cause for service of society.
- Visit to Museum/Science City

Note: In this section the students will be required to visit and write on the environment of an area/ ecosystem/vi1lage industry/disaster/mine/dam/agriculture field/waste management/hospital etc. with its salient features, limitations, their implications and suggestion for improvement.

References:

1. Agarwal, K. C. 2001. Environmental Biology, Nidhi Publications Ltd. Bikaner.
2. Bharucha, E. 2005. Textbook of Environmental Studies, Universities Press, Hyderabad.
3. Down to Earth, Centre for Science and Environment, New Delhi.
4. Jadhav, H. & Bhosale, V. M. 1995. Environmental Protection and Laws. Himalaya Pub.
5. Joseph, K. and Nagendran, R. 2004. Essentials of Environmental Studies, Pearson Education (Singapore) Pte. Ltd., Delhi.
6. Kaushik, A. & Kaushik, C. P. 2004. Perspective in Environmental Studies, New Age International (P) Ltd, New Delhi.
7. Miller, T. G. Jr. 2000. Environmental Science, Wadsworth Publishing Co.
8. Sharma, P. D. 2005. Ecology and Environment, Rastogi Publications, Meerut.
9. Booklet on Safe Driving. Sukhmani Society (Suvidha Centre), District Court Complex, Amritsar
10. Kanta, S., 2012. Essentials of Environmental Studies, ABS Publications, Jalandhar.

Course Outcomes

At the end of this course the student shall be able to:

CO-1	To know about the meaning of Biodiversity and its role in environment.
CO-2	To know about the causes of different forms of pollution and their control measures.
CO-3	To know about the causes and challenges of growing human population. Women and child welfare programs.
CO-4	To know the development of entrepreneurship and techniques of civil/self defense.

Bachelor of Computer Applications (Semester - IV)

BCA-245P: Lab I– (Data Structures implementation using C++)

Credit Hours (per week):4

Total Marks: 50
Practical Marks: 37
Practical Internal Assessment Marks: 13

Course Objectives:

1.	The main objective of this practical lab is to make the students to be able to implement the programs utilizing different data structure techniques to organize and manage data in computer's memory.
2.	The students will gain an understanding of different approaches available for searching and sorting the data and further be able to identify the methods requiring minimum time to perform the pre-mentioned tasks.

Lab – Data Structure implementation using C++

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Implement the real world applications by making use of linear data structure, such as, arrays, stacks, queues, linked lists, trees and graphs, to handle the data stored in computer's memory.
CO-2.	Perform the implementation using non-linear data structure, such as, trees and graphs.
CO-3.	Perform traversing, insertion, and deletion operations on the above mentioned data structures.
CO-4.	Perform the search operations by making use of suitable search technique.
CO-5.	Sort the data by using different sorting techniques and can also assess the time requirement of the available sorting techniques.

Bachelor of Computer Applications (Semester - IV)

BCA-246P: Lab II– (Distributed Computing)

Credit Hours (per week):4 **Total Hours:60**
Total Marks: 50 **Practical Marks: 37**
Practical Internal Assessment Marks: 13

Course Objectives:

1.	Demonstrate knowledge of the essential elements and concepts related to distributed system technologies.
2.	Demonstrate knowledge of the core architectural aspects of distributed systems.
3.	Design and implement distributed applications demonstrate knowledge of details of the main underlying components of distributed systems (such as RPC, file systems).
4.	Demonstrate experience in building large-scale distributed applications.

Lab II – Distributed Computed (Client Server, Distributed Objects and operating system issues**)**

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Practically implement the client-server architecture.
CO-2.	Understand the implementation of Remote Method Invocation.
CO-3.	Explain the design and development of distributed systems and distributed systems applications.
CO-4.	Implementation of Chat Server.
CO-5.	Implementation of Ping, trace routing, and IP-configuration commands.

Bachelor of Computer Applications

Semester – V

Sr. No.	Paper Code	Paper Name	Marks				Page No.
			Theory	Practical	Internal Assessment	Total	
1	BCA-351	Computer Networks	56	-	19	75	172-173
2	BCA-352	Programming in Java	56	-	19	75	174-175
3	BCA-353	Software Engineering	56	-	19	75	176-177
4	BCA-354	Advanced Web Technologies (ASP.NET)	56	-	19	75	178-179
5	BCA-355P	LabI: Programming and Web Development in ASP.NET	-	37	13	50	180
6	BCA-356P	Lab II : Programming in Java	-	37	13	50	181

Bachelor of Computer Applications (Semester – V)

BCA-351: Computer Networks

Time: 3 Hours **M. Marks: 75**
Credit Hours (per week):4 **Theory Marks: 56**
Total Hours:60 **Theory Internal Assessment Marks: 19**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks**.

Course Objectives:

1.	To develop an understanding of different components of computer networks, various protocols, modern technologies and their applications.
2.	To understand the working principle of various communication protocols.
3.	Study the basic taxonomy and terminology of the computer Networking and enumerate the layers of OSI model and TCP/IP model.
4.	Gain core Knowledge of network layer routing protocols and IP addressing.
5.	To know the concept of data transfer between nodes.

UNIT – I

Introduction: Network Definition, Basic components of a network, network types and topologies, Uses of computer networks, network architecture.
Transmission Media: Coaxial cable, twisted pair cable, fiber optics & satellites. OSI reference model, TCP/IP reference model, comparison of OSI and TCP reference model.
Introduction to Analog and Digital Transmission: Telephone system, Modems, Types of modems, pulse code modulation. Transmission & Switching: Multiplexing, circuit switching packet switching, hybrid switching, ISDN service transmission.

Local Area Network Protocols: CSMA Protocols, BRAP, MLMA, IEEE standards 802, Token Bus, Token Ring, FDDI.

UNIT – II

Data Link Layer Design Issues: Services provided to Network layer framing, error control, flow control, link management. Error detection & correction, Elementary Datalink Protocols.

Design Issues of Network Layer: Services provided to transport layer, routing, connection, internet & World Wide Web.

Network Security and Privacy: Brief Introduction to Cryptography.

Network Services: File transfer, Access & Management, Electronic Mail, Remote login.

References:

1. Tanenbaum A.S. 'Computer Network', PHI.
2. Stalings W., 'Data and Computer Communications', PHI.
3. Data Communication and Networking by Behrouz A Forouzan.
4. Stallings W. , Local Network: An Introduction Macmillan Publishing Co.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Identify the available internet access technologies and for each of these access technologies, provide a range of transmission rates and networking devices.
CO-2.	Recognize the technological trends of Computer Networking.
CO-3.	Discuss the process of Multiplexing, Switching and Transmission media in networks.
CO-4.	Describe the component and working of wireless networks.
CO-5.	Outline a suitable routing protocol for interconnected networks.

Bachelor of Computer Applications (Semester – V)

BCA-352: Programming in Java

Time: 3 Hours **M. Marks: 75**
Credit Hours (per week):4 **Theory Marks: 56**
Total Hours:60 **Theory Internal Assessment Marks: 19**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks**.

Course Objective:

1.	To become familiar with the features of Java Language
2.	To discover how to write Java code according to Object-Oriented Programming principles.
3.	To become comfortable with concepts such as Classes, Objects, Inheritance, Polymorphism and Interfaces
4.	To understand how to design, implement, test, debug, and document programs that use basic data types and computation, simple I/O, conditional and control structures, string handling and functions.
5.	To understand the importance of Classes & objects along with constructors, Arrays and Vectors.

UNIT –I

Basic concepts of Java Programming and applications of Java programming. Introduction to Java, JVM, Features of java, JDK Environment & tools like (java, javac, applet viewer, javadoc, jdb)
Object Oriented Programming Concepts: Overview of Programming, Paradigm, Classes, Abstraction, Encapsulation, Inheritance, Polymorphism, Difference between C++ and JAVA.
Java Programming Fundamentals : Structure of java program , Data types ,Variables, Operators , Keywords ,Naming Convention ,Decision Making (if,switch) ,Looping(for, while),Type Casting.

Classes and Objects: Creating Classes and objects, Memory allocation for objects, Constructor, Implementation of Inheritance (Simple, Multilevel, Hierarchical), Implementation of Polymorphism (Method Overloading , Method Overriding), Nested and Inner classes

UNIT-II

Arrays String and Vector: Arrays, Creating an array, Types of Array (One Dimensional arrays, Two Dimensional array), Strings, String – Arrays, String Methods, String Buffer class, Vectors, Wrapper classes.

Abstract Class, Interface and Packages, Modifiers and Access Control (Default, public private protected), Abstract classes and methods, Interfaces, Packages (Packages Concept, Creating user defined packages, Java Built in packages, Java.lang->math,Java.util->Random, Date, Hash Table)

Multithreading: Creating Threads using Different methods, Thread Priorities, Thread Synchronization, Inter process thread Communication.

Exception Handling: Exception types, using try catch and Multiple catch, Nested try, throw, throws and finally, Creating User defined Exceptions. File Handling: Byte Stream, character stream , file IO Basics , File Operations (Creating file, Reading, file(Character, byte), Writing File (Character, byte).

Applet Programming: Introduction, Types of applet, Applet Life cycle, Creating applet, Applet tag

References:

1. "Java–The Complete Reference", Herbert Schildt, Tata MacGraw Hill.
2. "Introduction to Java Programming", Y. Daniel Mliang, Pearsons Publications.
3. Programming with JAVA - E Balgurusamy
4. JAVA:How to Programm- Paul Deital and Harvey Deital.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Implement Object Oriented programming concept using basic syntaxes of control Structures, strings and function for developing skills of logic building activity.
CO-2.	Identify classes, objects, members of a class and the relationships among them needed for a finding the solution to specific problem
CO-3.	Demonstrates how to achieve reusability using inheritance, interfaces and packages and describes faster application development can be achieved.
CO-4.	Demonstrate understanding and use of different exception handling mechanisms and concept of multithreading for robust faster and efficient application development.
CO-5.	Identify and describe common abstract user interface components to design GUI in Java using Applet & AWT along with response to events.

Bachelor of Computer Applications (Semester – V)

BCA-353: Software Engineering

Time: 3 Hours **M. Marks: 75**
Credit Hours (per week):4 **Theory Marks: 56**
Total Hours:60 **Theory Internal Assessment Marks: 19**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks**.

Course Objectives:

1.	Give the basic knowledge in Software Engineering process, focusing on the different process models.
2.	To inculcate in students' different concepts of software engineering principles.
3.	To produce efficient, reliable, robust and cost- effective software solutions.
4.	Ability to develop, maintain and evaluate large-scale software systems.

UNIT – I

Introduction to Software: Definition, Software characteristics, Software components, Software Applications.
Introduction to Software Engineering: Definition, Software Engineering Paradigms, waterfall method, prototyping, interactive Enhancement, The Spiral model, Fourth Generation Technique.
Software Metrics: Role of Metrics and measurement, Metrics for software productivity and quality, Measurement software, size–oriented metrics, function oriented metrics, Metrics for software quality.
Software Requirement Specification (SRS): Problem analysis, structuring information, Data flow diagram and data dictionary, structured analysis, Characteristics and component of (SRS).

UNIT – II

Planning a Software Project: Cost estimation, uncertainties in cost estimation, Single variable model, COCOMO model, On software size estimation, Project scheduling and milestones, Software & Personal Planning, Rayleigh curve, Personal Plan, Quality Assurance Plan, Verification & Validation (V & V), inspection & review.
System Design: Design Objectives, Design Principles, problem, Partitioning, Abstraction, Top Down and Bottom–up techniques, Structure Design, Structure Charts, Design Methodology, Design Review, Automated Cross Checking, Matrix, total number of modular, number of parameters.

Detailed Design: Module specification, Specifying functional module, specifying data abstraction, PDL and Logic/Algorithm Design.
Coding: Coding by Top–down and Bottom–up, Structured Programming, Information Hiding, Programming style, Internal Documentation.
Testing: Level of testing, Test cases and test criteria, Functional Testing, Structural Testing.

References:

1. Software Engineering, Roger S. Pressman.
2. Integrated Approach to Software Engineering, Pankaj Jalote
3. Software Engineering by Rajib Mall.
4. Software Engineering by Ian Sommerville.

Course Outcomes:

On completion of this course student will be able to:

CO-1.	Decompose the given project in various phases of a lifecycle.
CO-2.	Choose appropriate process model depending on the user requirements.
CO-3.	Perform various life cycle activities like Analysis, Design, Implementation, Testing and Maintenance.
CO-4.	Know various processes used in all the phases of the product.
CO-5.	Apply the knowledge, techniques, and skills in the development of a software product.

Bachelor of Computer Applications (Semester – V)

BCA-354: Advanced Web Technologies (ASP.NET)

Time: 3 Hours **M. Marks: 75**
Credit Hours (per week):4 **Theory Marks: 56**
Total Hours:60 **Theory Internal Assessment Marks: 19**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks**.

Course Objectives:

1.	Set up a programming environment for ASP.net programs.
2.	Develop a data driven web application.
3.	Connecting to data sources and managing them.
4.	Maintain session and controls related information for user used in multi-user web applications.
5.	Understand the fundamentals of developing modular application by using object-oriented methodologies.

UNIT-I

Standard Controls: Display information, accepting user input, Submitting form data, Displaying images, Using the panel control, Using the hyperlink control.
Validation Controls: Using the required field validator control, Using the range validator control using the compare validator control, Using the regular expression validator control, Using the custom validator control, Using the validation summary controls.
Rich Controls: Accepting file uploads, displaying a calendar, displaying advertisement, displaying different page views, Displaying a wizard.
Designing Website with Master Pages: Creating master pages, modifying master page content, Loading master page dynamically.

UNIT-II

SQL Data Source Control: Creating database connections, executing database commands, Using ASP.NET parameters with the SQL data source controls, programmatically executing SQL data source commands, Caching database data with the SQL data Source controls.
List Controls: Dropdown list control, Radio button list controls, list box controls, bulleted list controls, custom list controls.
Grid View Controls: Grid view control fundamentals, using field with the grid view control, Working with grid view control events.
Building Data Access Components with ADO.NET: Connected the data access, Disconnected data access, executing a synchronous database commands, Building data base objects with the .NET framework.

References:

ASP.NET 3.5: Stephen Walther, Pearson Education, 2005
ASP.NET 4.0: In Simple Steps by Kogent Learning Solutions Inc.
ASP.NET 4.5: Black Book by Kogent Learning Solution Inc.

Course Outcomes:

On completion of this course student will be able to:

CO-1.	Use the features of Dot Net Framework along with the features of ASP. NET & C#.
CO-2.	Design web applications using ASP.NET.
CO-3.	Learn ASP.NET controls in web applications.
CO-4.	Debug and deploy ASP.NET web applications.
CO-5.	Learn to create database driven ASP.NET web applications and web services.

Bachelor of Computer Applications (Semester – V)

BCA-355P: Lab I
Programming and Web Development in ASP.NET

Credit Hours (per week):4 **Total Marks: 50**
Total Hours:60 **Practical Marks: 37**
Practical Internal Assessment Marks: 13

Course Objectives:

1.	The students will Study the architecture of Dot Net framework and implement it using C# programming and visual studio.
2.	Understand the basic principles of website development using IDE and implement it.
3.	Learn advanced web development techniques using session and database connectivity.

Lab I: Programming and Web Development in ASP.NET

Course Outcomes:

On completion of this course student will be able to:

CO-1.	Use the features of Dot Net Framework along with the features of ASP. NET & C#.
CO-2.	Design web applications using ASP.NET.
CO-3.	Learn ASP.NET controls in web applications.
CO-4.	Debug and deploy ASP.NET web applications.
CO-5.	Learn to create database driven ASP.NET web applications and web services.

Bachelor of Computer Applications (Semester – V)

BCA-356P: LAB II

Credit Hours (per week):4
Total Hours:60 **Total Marks: 50**
Practical Marks: 37
Practical Internal Assessment Marks: 13

Course Objectives:

1.	To become familiar with the features of Java Language
2.	To discover how to write Java code according to Object-Oriented Programming principles.
3.	To become comfortable with concepts such as Classes, Objects, Inheritance, Polymorphism and Interfaces
4.	To understand how to design, implement, test, debug, and document programs that use basic data types and computation, simple I/O, conditional and control structures, string handling and functions.
5.	To understand the importance of Classes & objects along with constructors, Arrays and Vectors.

Lab II: Programming in JAVA

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Implement Object Oriented programming concept using basic syntaxes of control Structures, strings and function for developing skills of logic building activity.
CO-2.	Identify classes, objects, members of a class and the relationships among them needed for a finding the solution to specific problem.
CO-3.	Demonstrates how to achieve reusability using inheritance, interfaces and packages and describes faster application development can be achieved.
CO-4.	Demonstrate understanding and use of different exception handling mechanisms and concept of multithreading for robust faster and efficient application development.
CO-5.	Identify and describe common abstract user interface components to design GUI in Java using Applet & AWT along with response to events.

Bachelor of Computer Applications

Semester – VI

Sr. No.	Paper Code	Paper Name	Marks				Page No.
			Theory	Practical	Internal Assessment	Total	
1	BCA-361	Computer Graphics	56	-	19	75	183-184
2	BCA-362	Operating System	56	-	19	75	185-186
3	BCA-363P	Lab. Implementation of Applications of Computer Graphics in C++/C	-	37	13	50	187
4	BCA-364P	Project	-	150	50	200	188

Bachelor of Computer Applications (Semester – VI)

BCA-361: Computer Graphics

Time: 3 Hours **M. Marks: 75**
Credit Hours (per week):4 **Theory Marks: 56**
Total Hours:60 **Theory Internal Assessment Marks: 19**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks**.

Course Objectives:

1.	The course introduces the basic concepts of computer graphics.
2.	It provides the necessary theoretical background and demonstrates the application of computer science to graphics.
3.	The course further allows students to develop programming skills in computer graphics through programming assignments.

UNIT – I

Overview of Graphics System: Computer Graphics and their applications
Display Devices: CRT Monitors (Random – Scan and Raster Scan, DVST, Plasma – Panel Display, LED and LCD Monitors.
Graphics Software.
Elementary Drawing: Points and various line drawing Algorithms and their comparisons. Circle generating algorithms, Algorithms for other objects like ellipses, arcs, section spirals.

UNIT – II

Two Dimensional Transformations: Basic Transformations, Scaling, Translation, Rotation, Reflection, Shear, Matrix representation of Basic transformations and homogenous coordinates.
Composite Transformations:

Windowing and clipping. Windowing concepts, clipping and its algorithms. Window–to–view port transformations. Three Dimensional concepts. 3 D Coordinate Systems. 3 transformations. translation, scaling, rotation, projections, parallel projections. Perspective projection.
Implementation in C: C programming for drawing 2 D objects – line rectangle, arc, circle andellipse. C Programming for 2–D and 3–D transformations which include translation, rotation, scaling, reflection and shear.

References:

1. Computer Graphics by Donal Hearn M. Pardive Baker (PHI) Easter Economy Edition.
2. Computer Graphics by Schaum's outlines by Tata McGraw Hill.
3. Computer Graphics by Roy A. Plastock and Gordon Kalley – Schaum's Series.
4. Computer Graphics by Marc Berger.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Understand the basics of computer graphics, different graphics systems and applications of computer graphics.
CO-2.	Discuss various algorithms for scan conversion and filling of basic objects and their comparative analysis.
CO-3.	Use of geometric transformations on graphics objects and their application in composite form.
CO-4.	Extract scene with different clipping methods and its transformation to graphics display device.
CO-5.	Explore projections for display of 3D scene on 2D screen.

Bachelor of Computer Applications (Semester – VI)

BCA-362: Operating System

Time: 3 Hours **M. Marks: 75**
Credit Hours (per week):4 **Theory Marks: 56**
Total Hours:60 **Theory Internal Assessment Marks: 19**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks**.

Course Objectives:
The objectives of this course is:

1.	To understand what a process is and how processes are synchronized and scheduled.
2.	To Know about the services provided and the design of an operating system.
3.	To understand the structure and organization of the file system.
4.	To Learn different approaches to memory management.
5.	Able to use system calls for managing processes, memory and the file system.
6.	Understand the data structures and algorithms used to implement an OS.

UNIT – I

Introduction: Definition, Early Systems, Simple Batch system, Multi programmed Batch. Time Sharing Systems, Personal Computer System, Parallel Systems, Distributed Systems, Real–time Systems.
Processes: Process concepts, Process Scheduling, Threads.
CPU–Scheduling: Basic concepts, scheduling criteria, scheduling algorithms, algorithm evaluation.
Process Synchronization: Critical – section problem, semaphores, classical problem of synchronization.
Deadlocks: System Model, Deadlock characterization, methods for handing deadlocks, Deadlocks Prevention, Deadlock avoidance, Deadlock Detection and Recovery from deadlock, Combined approach to deadlock handling.

UNIT – II

Memory Management: Background, Logical v/s Physical address space, swapping, continuous

allocation, paging, segmentation.

Virtual Memory: Background, demand paging, Performance of Demand Paging, Page Replacement, Page Replacement Algorithms, Allocation of Frames, Thrashing.

Secondary Storage Structures: Disk structures, Disk scheduling, Disk Reliability.

References:

1. "Operating System Concepts", Fourth Edition by Silberschatz Galvin Addison Wesley.
2. "Operating Systems: A Design Oriented Approach" by Crowley, Published by Tata McGraw Hill.
3. "Operating Systems" Second Edition by Dietel, Addison Wesley.
4. Madnick & Donovan: Operating System, McGraw Hill
5. A.C. Shaw:Logic Design of Operating Sytem, Prentice Hall.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	To understand the working of an OS as a resource manager, file system manager, process manager, memory manager and I/O manager and methods used to implement the different parts of OS.
CO-2.	To understand the main components of an OS & their functions.
CO-3.	Describe the important computer system resources and the role of operating system in the management policies and algorithms.
CO-4.	Evaluate the requirement for process synchronization and coordination handled by operating system.
CO-5.	Students will be able to implement advance features of object-oriented approach in other various language(s).
CO-6.	Describe and analyze the memory management and its allocation policies.
CO-7.	Identify use and evaluate the storage management policies with respect to different storage management technologies.
CO-8.	Identify the need to create the special purpose operating system.
CO-9.	To understand the concepts and implementation Memory management policies and virtual Memory.

Bachelor of Computer Applications (Semester – VI)

BCA-363P: Lab I

Credit Hours (per week):4
Total Hours:60

Total Marks: 50
Practical Marks: 37
Practical Internal Assessment Marks: 13

Course Objectives:

1.	Understand the need of developing graphics application
2.	To make the students understand graphics concepts and develop, design and implement two and three-dimensional graphical structures
3.	Learn the representation and transformation of graphical objects.

Lab I (Programming Lab of Computer Graphics in C++/C)

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Understand the basic concepts of computer graphics.
CO-2.	Understand how to generate line, circle and ellipse also how to create 2D object.
CO-3.	Implement basic transformations on objects.
CO-4.	Implement clipping algorithm on lines.
CO-5.	Understand various 3D Transformation techniques

Bachelor of Computer Applications (Semester – VI)

BCA-364P: **PROJECT**

Credit Hours (per week):4 **Max. Marks: 200**
Total Hours: 60 **Project Marks: 150**
Project Internal Assessment: 50

Course Objectives:

1.	Develop skills in presentation and discussion of research topics in a public forum.
2.	Exposure to a variety of research projects and activities in order to enrich their academic experience
3.	It makes the student confident in designing an Online Project with advanced technologies on their choice
4.	Students are trained to meet the requirements of the industry.

General Instructions:

1. A software module based on the work done in the entire course is to be developed.

2. The soft copy of the module shall be submitted to the College/Institute till April 30.

3. The software module shall be developed in groups, consisting of at most two students in a group.
4. The respective college shall depute guide(s)/supervisor(s) under whose supervision the software module shall be developed. The guide/supervisor shall clarify that the work done is original & authenticated. The certificate found to be incorrect at any stage shall attract the proceedings against all the stakeholders, as per the University rules.
5. The evaluation of the module shall be done as per the common ordinance of UG/PG w.e.f. 2012–2013 under semester system.
6. Training certificate of industrial training should be submitted to the College and also attached in the project.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	To carry out time planning for the project.
CO-2.	To follow correct grounding and shielding practices
CO-3.	To do effective trouble-shooting of the mini project.
CO-4.	Demonstrate a through and systematic understanding of project contents.
CO-5.	Understand methodologies and professional way of documentation and communication.
CO-6.	Know the key stages in development of the project.

SYLLABUS FOR THE BATCH FROM THE YEAR 2022 TO YEAR 2025

Programme Code: BIT

Programme Name: B.Sc. (Information Technology)

(Semester I-VI)

Examinations: 2022-2025

P.G. Department of Computer Science & Applications

Khalsa College, Amritsar

Programme name: B.Sc. (Information Technology)
Programme code: BIT
Programme Duration :3 years

Prgramme Objectives:

1.	To synergize Information Technology in its entire ramification.
2.	To provide basic inputs in various aspects of and a broad understanding of IT and its other interdisciplinary interfaces.
3.	Focus of the program is Information Technology and Management of Information Technology.
4.	To cater to the needs of effectively managing the business by bridging the gap between managerial practices in vogue and Information Technology.
5.	To think analytically, creatively and critically in developing robust, extensible and highly maintainable technological solutions to simple and complex
6.	To apply their knowledge and skills to be employed and excel in IT professional careers and/or to continue their education in IT and/or related post graduate programmes.

Program Specific Outcomes (PSOs):

PSO-1.	To widen the understanding of computing technologies and covers high level concept that enable the effective management and planning of IT project and services.
PSO-2.	To gain understanding about techniques, technologies and methods used in managing and implementing information technology systems.
PSO-3.	To gain technical specializations, management and planning of IT project and services.
PSO-4.	To develop and analyze quality computer applications by applying knowledge of software engineering, algorithms, programming, databases and networking.
PSO-5.	To identify and utilize the state-of-the-art tools and techniques in the design and development of software products and solutions.
PSO-6.	To gain practical experience in shipping real world software, using recent industry standard tools and collaboration techniques will equip to secure and succeed in IT industry.
PSO-7.	To develop an ability to communicate effectively with a range of audiences, develop written and oral presentations of information technology solutions appropriate for a wide range of audiences.

B.Sc. (Information Technology)

Semester-I

Sr. No	Paper Code	Paper Name	Marks				Page No.
			Theory	Practical	Internal Assessment	Total Marks	
1	BIT-111	Fundamentals of Computers	56	-	19	75	192-193
2	BIT-112	Introduction to Programming-C	56	-	19	75	194-195
3	BIT-113	Applied & Discrete Mathematics	56	-	19	75	196-197
4	BCSE-1122	Communication Skills in English	37	-	13	50	198-199
5	BHPB-1101/BPBI-1102/BPHC-1104	Punjabi/Basic Punjabi (Mudhli Punjabi) (Compulsory) / Punjab History & Culture	37	-	13	50	200-203
6	BIT-114P	Practical- PC Computing & C - Language	-	56	19	75	204
7	ZDA111	*Drug Abuse: Problem, Management and Prevention (Compulsory Paper)	37		13	50	205-207

- **Marks of Paper-VII will not be included in the Total Marks**

B.Sc. (Information Technology) Semester – I

BIT-111: Fundamentals of Computers

Time: 3 Hours
Credit Hours (per week):4 **Max. Marks: 75**
Total Hours:60 **Theory Marks: 56**
Theory Internal Assessment Marks: 19

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from UNIT-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **11 marks**. The total weightage of this section shall be **22 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from UNIT-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **11 marks**. The total weightage of this section shall be **22 marks**.

Course Objectives:

1.	Teach the fundamentals so students can efficiently use MS Word
2.	Provide a knowledge base for Computer Fundamentals & MS Word upon which you can build.
3.	Use real-world examples and procedures that will prepare you to be a skilled user of Computer & MS Word, MS Power Point & MS Excel.

UNIT-I

1. Introduction to Computer:
Computer System Characteristics, Hardware - CPU, Memory, Input, Output & Storage devices, Organization of Secondary Storage Media**,** Software - System & Application, Types of processing: Batch and On-line.
2. MS Word 2010:
Overview, creating, saving, opening, importing, exporting and inserting files, formatting pages, paragraphs and sections, indents and outdents, creating lists and numbering. Headings, styles, fonts and font size. Editing, positioning and viewing texts, Finding and replacing text, inserting page breaks, page numbers, book marks, symbols and dates. Using tabs and tables, header, footer and printing. Headers and Footers, Mail merge, macros, tables.

UNIT-II

3. Operating System Concepts:

Role of an Operating System, Types of operating systems, Booting procedure and its types, Fundamentals and typical instructions of Windows & Non-Windows based Operating Systems.

4. MS – PowerPoint 2010:

Introduction to MS Power Point, Power Point Elements, Exploring Power Point Menu, Working with Dialog Boxes, Saving Presentation, Printing Slides, Slide View, Slide Sorter view, notes view, outline view, Formatting and enhancing text formatting.

References:

1. R.K. Taxali : Introduction to Software Packages, Galgotia Publicaions.
2. MS–Office , Compiled by SYBIX.
3. MS–Office , BPB Publications.
4. Introduction to Computer, P.K. Sinha.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Describe the usage of computers and why computers are essential components in business and society.
CO-2.	Solve common problems using appropriate Computer Fundamentals.
CO-3.	Identify categories of programs, system software and applications. Organize and work with files and folders.
CO-4.	Describe the important computer system resources and the role of operating system in their management policies and algorithms.

B.Sc. (Information Technology) Semester – I

BIT-112: Introduction to Programming - C

Time: 3 Hours **Max. Marks: 75**
Credit Hours (per week):4 Total Hours:60 **Theory Marks: 56**
Theory Internal Assessment Marks: 19

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks**.

Course Objectives:

1.	To learn the fundamental programming concepts and methodologies which are essential to building good C programs.
2.	To practice the fundamental programming methodologies in the C programming language via laboratory experiences. Microsoft Visual Studio is the programming environment that will used.
3.	To code, document, test, and implement a well-structured, robust computer program using the C programming language.
4.	To write reusable modules (collections of functions).

UNIT –I

Fundamentals: Character set, Identifiers and Key Words, Data types, Constants, Variables, Expressions, Statements, Symbolic Constants.
Operations and Expressions: Arithmetic operators, Unary operators, Relational Operators, Logical Operators, Assignment and Conditional Operators, Library functions. Data Input and Output statements
Control Statements: Preliminaries, While, Do–while and for statements, Nested loops, If–else, Switch, Break – Continue statements.
Program Structure Storage Class: Automatic, external and static variables, multiple programs, more about library functions.
Functions: Brief overview, defining, accessing functions, passing arguments to function, specifying argument data types, function prototypes, recursion.

UNIT –II

Arrays: Defining, processing an array, passing arrays to a function, multi–dimensional arrays.
Strings: String declaration, string functions and string manipulation
Structures & Unions: Defining and processing a structure, user defined data types, structures and pointers, passing structures to functions, self-referenced structure and unions.
Pointers: Fundamentals, pointer declaration, passing pointer to a function, pointer and one dimensional arrays, operation on pointers, pointers & multi–dimensional arrays of pointers, passing functions, other functions, more about pointer declarations.

References:

1. Balaguruswamy: "Programming in ANSI C".
2. Scaum Outline Series: "Programming in C".
3. Dennis & Ritchie: "Programming in C".
4. Stephen G. Kochar: "C Programming".

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Use the fundamentals of C programming in trivial problem solving.
CO-2.	Apply skill of identifying appropriate programming constructs for problem Solving.
CO-3.	Enhance skill on problem solving by constructing algorithms.
CO-4.	Identify solution to a problem and apply control structures and use defined functions for solving the problem.

B.Sc. (Information Technology) Semester – I

BIT-113: Applied & Discrete Mathematics

Time: 3 Hours **Max. Marks: 75**
Credit Hours (per week):4 Total Hours:60 **Theory Marks: 56**
Theory Internal Assessment Marks: 19

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks.**

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks**.

Course Objectives:

1.	The major objective of this course is to explore those mathematical concepts which are applied into computer application/programming in well manner.
2.	To strengthen the logic development ability in students by solving the problems related to symbolic logics, matrix operations and Boolean algebra etc.

UNIT-I

Sets and Relations: Definition of sets, subsets, complement of a set, universal set, intersection and union of sets, De-Morgan's laws, Cartesian products, Equivalent sets, Countable and uncountable sets, minset, Partitions of sets, Relations: Basic definitions, graphs of relations, properties of relations

Logic and Propositional Calculus: Proposition and Compound Propositions, basic Logical Operations, Propositions and Truth Tables, Tautologies and Contradictions, Logical Equivalence, Duality law, Algebra of propositions, Conditional and Bi conditional Statements, Arguments, Logical Implication, Propositional Functions, Predicates and Quantifiers, Negation of Quantified Statements, Inference theory of the predicates calculus.

UNIT-II

Boolean Algebra: Boolean algebra and its duality, Duality, Boolean Algebra as Lattices, Boolean identities, sub-algebra, Representation Theorem, Sum-of-Products Form for Sets, Sum of-Products Form for Boolean Algebra, Minimal Boolean Expressions, Prime Implicants, Boolean Functions, Karnaugh Maps.

Matrices: Introduction of a Matrix, its different kinds, matrix addition and scalar multiplication, multiplication of matrices, transpose etc. Square matrices, inverse and rank of a square matrix, Matrix Inversion method.

Graph Theory: A general introduction, simple and multi graphs, directed and undirected graphs, Eulerian and Hamiltonian Graphs, Shortest path algorithms, Chromatic number, Bi partite graph, graph coloring.

References:

1. Lipschutz, S. and Lipson, M.: Discrete Mathematics (Schaum's outlines series).
2. Kolman and Busby " Discrete Mathematical structures for Computer Sciences" PHI.
3. Alan Doerr,"Applied Discrete Structures for Computer Science", Galgotia Publications.
4. Trambley, J.P. and Manohar,R: Discrete Mathematical Structures with Applications to Computer Science.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Evaluate basic logic statements using compound statements, implications, inverses, converses, and contra positives using truth tables and the properties of logic.
CO-2.	Develop ability of conversion of logic sentence in terms of predicates, quantifiers, and logical connectives.
CO-3.	Learn to use various matrix operations such as matrix addition, multiplication, transpose, inverse and calculation of rank of matrix.
CO-4.	Apply the operations of sets, relations and use Venn diagrams to solve real life mathematical.
CO-5.	Get in-depth knowledge of graph theory from the point of view of problem solving strategy used in game design and assignment problems.

B.Sc. (Information Technology) Semester – I

BCSE-1122: COMMUNICATION SKILLS IN ENGLISH

Time: 3 Hours **Max. Marks: 50**
Credit Hours (per week):4 **Theory Marks: 37**
Total Hours:60 **Internal assessment: 13**

Suggested Pattern of Question Paper:
The question paper will consist of Seven skill–oriented questions from Reading and Writing Skills. The first 6 Questions carry 5 marks each. The 7th Question carries 7 marks. The questions shall be phrased in a manner that students know clearly what is expected of them. There will be internal choice wherever possible.

i) Comprehension questions of an unseen passage.
ii) Personal letter Official/Business letters.
iii) Writing notices/agenda/resolution/ minutes for public circulation on topics of professional interest
iv) Writing resume or converting a biographical note into resume
v) Writing news report based on a given heading
vi) Do as directed
Articles Units 69-81
Conjunctions Units 113-120 (6X5=30 Marks)
vii) Translation from English to Vernacular (Punjabi/ Hindi) (Isolated Sentences)(1X7=7 Marks)

Course Objectives:

1.	Import knowledge of Punjabi as basic objective of education.
2.	A literary attitude to make students create open minded.
3.	To have knowledge about various genre of literature.

Course Contents:
1. Reading Skills: Reading tactics and strategies; Reading purposes–kinds of purposes and associated comprehension; Reading for direct meanings; Reading for understanding concepts, details, coherence, logical progression and meanings of phrases/ expressions.
Activities:
d) Active reading of passages on general topics
e) Reading newspaper, articles, editorials etc.
f) Short questions based on content and development of ideas of a given paragraph.
2. Writing Skills: Guidelines for effective writing; writing styles for application, resume, personal letter, official/ business letter, memo, notices etc.
Activities:
f) Personal and business letters.
g) Converting a biographical note into a sequenced resume.
h) Writing notices for circulation/ boards.
i) Making notes of given passage with headings and sub-headings
j) Writing newspaper reports based on given heading.

Prescribed Book:

Murphy's English Grammar **(by Raymond Murphy) CUP**

Recommended Books:

1. ***Oxford Guide to Effective Writing and Speaking*** **by John Seely.**
2. ***The Written Word*** **by Vandana R Singh, Oxford University Press**

Course Outcomes:

CO-1.	Students will improve their speaking ability in English both in terms of valency and comprehensibility.
CO-2.	Students will give oral presentations and receive feedback on their performance.
CO-3.	It enhance and development the two way process which is helpful to establish healthy relationships among the speakers and the listeners.

B.Sc. (Information Technology) Semester – I
SEMESTER-I
BHPB-1101: **ਲਾਜ਼ਮੀ ਪੰਜਾਬੀ**

ਸਮਾਂ : 3 ਘੰਟੇ ਕ੍ਰੈਡਿਟ ਪ੍ਰਤੀ ਹਫਤਾ : 04
ਕੁੱਲ ਘੰਟੇ : 60 ਥਿਊਰੀ ਅੰਕ : 37, ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ : 13, ਕੁੱਲ ਅੰਕ : 50

ਅੰਕ-ਵੰਡ ਅਤੇ ਪ੍ਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

- ਸਿਲੇਬਸ ਦੇ ਚਾਰ ਭਾਗ ਹਨ ਪਰ ਪ੍ਰਸ਼ਨ-ਪੱਤਰ ਦੇ ਪੰਜ ਭਾਗ ਹੋਣਗੇ। ਪਹਿਲੇ ਚਾਰ ਭਾਗਾਂ ਵਿਚ 02-02 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰੇਕ ਭਾਗ ਵਿਚੋਂ 01-01 ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਲਾਜ਼ਮੀ ਹੋਵੇਗਾ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ (08) ਅੰਕ ਹੋਣਗੇ। ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਪੰਜਵੇਂ ਭਾਗ ਵਿਚ ਸਾਰੇ ਸਿਲੇਬਸ ਵਿਚੋਂ 01-01 ਅੰਕ ਦੇ ਛੇ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ, ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ 05 ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ ਦੇਣਾ ਲਾਜ਼ਮੀ ਹੋਵੇਗਾ। ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ-ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।
  ਨੋਟ: ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ 13 ਅੰਕਾਂ ਦੀ ਹੈ, ਜੋ ਕਾਲਜ ਵੱਲੋਂ ਨਿਰਧਾਰਿਤ ਦਿਸ਼ਾ ਨਿਰਦੇਸ਼ਾਂ ਅਨੁਸਾਰ ਥਿਊਰੀ ਅੰਕਾਂ ਤੋਂ ਵੱਖਰੀ ਹੋਵੇਗੀ। ਇਸ ਪੇਪਰ ਦੇ ਕੁੱਲ ਅੰਕ 37+13 = 50 ਹਨ।

ਕੋਰਸ ਦਾ ਉਦੇਸ਼ Course Objective

- ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਸਾਹਿਤਕ ਰੁਚੀਆਂ ਪੈਦਾ ਕਰਨਾ।
- ਆਲੋਚਨਾਤਮਕ ਰੁਚੀਆਂ ਵਿਕਸਤ ਕਰਨਾ।
- ਮਾਤ ਭਾਸ਼ਾ ਦੀ ਸਮਝ ਨੂੰ ਵਿਕਸਤ ਕਰਨਾ

ਪਾਠ-ਕ੍ਰਮ ਨਤੀਜੇ Course Outcomes (COs)

- ਵਿਦਿਆਰਥੀ ਦੀ ਸਾਹਿਤਕ ਸੋਚ-ਸਮਝ ਵਿਕਸਤ ਹੋਵੇਗੀ।
- ਉਸ ਵਿਚ ਸਾਹਿਤ ਰੁਚੀਆਂ ਵਿਕਸਤ ਹੋਣਗੀਆਂ।
- ਉਸ ਵਿਚ ਸਾਹਿਤ ਸਿਰਜਣਾ ਦੀ ਸੰਭਾਵਨਾ ਵਧੇਗੀ।
- ਉਹ ਕਿਸੇ ਵੀ ਵਿਸ਼ੇ ਦਾ ਗਹਿਨ ਅਧਿਐਨ ਕਰਨ ਦੇ ਕਾਬਲ ਹੋਵੇਗਾ।
- ਉਹ ਮਾਤ ਭਾਸ਼ਾ ਦੇ ਵਿਕਾਸ ਵਿਚ ਵਿਸ਼ੇਸ ਯੋਗਦਾਨ ਪਾਉਣਗੇ।

ਪਾਠ-ਕ੍ਰਮ

ਭਾਗ-ਪਹਿਲਾ

ਸਾਹਿਤ ਦੇ ਰੰਗ, ਡਾ. ਮਹਿਲ ਸਿੰਘ (ਸੰਪਾ.), ਰਵੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।
ਭਾਗ ਪਹਿਲਾ - ਕਵਿਤਾ ਅਤੇ ਕਹਾਣੀ, ਡਾ. ਮਹਿਲ ਸਿੰਘ ਅਤੇ ਡਾ. ਆਤਮ ਰੰਧਾਵਾ (ਸਹਿ ਸੰਪਾ.)
(ਕਵਿਤਾ ਭਾਗ ਵਿਚੋਂ ਪ੍ਰਸੰਗ ਸਹਿਤ ਵਿਆਖਿਆ/ਵਿਸ਼ਾ-ਵਸਤੂ। ਕਹਾਣੀ ਭਾਗ ਵਿਚੋਂ ਸਾਰ/ਵਿਸ਼ਾ-ਵਸਤੂ)

ਭਾਗ-ਦੂਜਾ

ਇਤਿਹਾਸਿਕ ਯਾਦਾਂ
ਸ. ਸ. ਅਮੋਲ (ਸੰਪਾ.), ਪੰਜਾਬੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।
(ਨਿਬੰਧ 1 ਤੋਂ 6 ਤਕ ਸਾਰ/ ਵਿਸ਼ਾ-ਵਸਤੂ/ਸ਼ੈਲੀ)

ਭਾਗ-ਤੀਜਾ

(ੳ) ਪੈਰ੍ਹਾ ਰਚਨਾ (ਤਿੰਨਾਂ ਵਿਚੋਂ ਇਕ)
(ਅ) ਪੈਰ੍ਹਾ ਪੜ੍ਹ ਕੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ

ਭਾਗ-ਚੌਥਾ

(ੳ) ਭਾਸ਼ਾ ਵੰਨਗੀਆਂ : ਭਾਸ਼ਾ ਦਾ ਟਕਸਾਲੀ ਰੂਪ, ਭਾਸ਼ਾ ਅਤੇ ਉਪ-ਭਾਸ਼ਾ ਵਿਚਲਾ ਅੰਤਰ, ਪੰਜਾਬੀ ਉਪ-ਭਾਸ਼ਾਵਾਂ ਦੇ ਪਛਾਣ-ਚਿੰਨ੍ਹ
(ਅ) ਪੰਜਾਬੀ ਭਾਸ਼ਾ : ਨਿਕਾਸ ਤੇ ਵਿਕਾਸ

B.Sc. (Information Technology) Semester – I

BPBI-1102

ਮੁਢਲੀ ਪੰਜਾਬੀ

(In Lieu of Compulsory Punjabi)

ਸਮਾਂ : 3 ਘੰਟੇ ਕ੍ਰੈਡਿਟ ਪ੍ਰਤੀ ਹਫਤਾ : 04

ਕੁੱਲ ਘੰਟੇ : 60 ਥਿਊਰੀ ਅੰਕ : 37, ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ : 13, ਕੁੱਲ ਅੰਕ : 50

ਅੰਕ-ਵੰਡ ਅਤੇ ਪ੍ਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

- ਪਹਿਲੇ ਭਾਗ ਵਿਚੋਂ ਚਾਰ ਵਰਣਨਾਤਮਕ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਤਿੰਨ ਪ੍ਰਸ਼ਨਾਂ ਦਾ ਉੱਤਰ ਦੇਣਾ ਲਾਜ਼ਮੀ ਹੈ। ਹਰ ਪ੍ਰਸ਼ਨ ਦੇ ਚਾਰ-ਚਾਰ ਅੰਕ ਹਨ। ਭਾਗ ਦੂਸਰਾ ਵਿਚੋਂ ਦੋ-ਦੋ ਅੰਕ ਦੇ ਪੰਜ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਸਾਰੇ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹਨ। ਭਾਗ ਤੀਸਰਾ ਵਿਚੋਂ ਤਿੰਨ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਲਾਜ਼ਮੀ ਹਨ ਜਿਨ੍ਹਾਂ ਦੇ ਪੰਜ-ਪੰਜ ਅੰਕ ਹਨ। ਭਾਗ ਚੌਥਾ ਵਿਚ ਪੰਜ ਅਸ਼ੁੱਧ ਸ਼ਬਦਾਂ ਨੂੰ ਸ਼ੁੱਧ ਕਰਕੇ ਲਿਖਣਾ ਹੋਵੇਗਾ।

  ਨੋਟ: ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ 13 ਅੰਕਾਂ ਦੀ ਹੈ, ਜੋ ਕਾਲਜ ਵੱਲੋਂ ਨਿਰਧਾਰਿਤ ਦਿਸ਼ਾ ਨਿਰਦੇਸ਼ਾਂ ਅਨੁਸਾਰ ਥਿਊਰੀ ਅੰਕਾਂ ਤੋਂ ਵੱਖਰੀ ਹੋਵੇਗੀ। ਇਸ ਪੇਪਰ ਦੇ ਕੁਲ ਅੰਕ 37+13 = 50 ਹਨ।

ਕੋਰਸ ਦਾ ਉਦੇਸ਼ Course Objective

- ਵਿਦਿਆਰਥੀ ਨੂੰ ਸ਼ੁੱਧ ਪੰਜਾਬੀ ਪੜ੍ਹਨਾ-ਲਿਖਣਾ ਸਿਖਾਉਣਾ।
- ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੀਆਂ ਵਿਆਕਰਨਕ ਬਾਰੀਕੀਆਂ ਤੋਂ ਜਾਣੂ ਕਰਾਉਣਾ।
- ਸ਼ੁੱਧ ਸੰਚਾਰ ਨੂੰ ਵਿਕਸਤ ਕਰਨਾ।

ਪਾਠ-ਕ੍ਰਮ ਨਤੀਜੇ Course Outcomes (COs)

- ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਅਤੇ ਗੁਰਮੁਖੀ ਲਿਪੀ ਦੀ ਸਿਖਲਾਈ ਵਿਚ ਮੁਹਾਰਤ ਹਾਸਿਲ ਕਰਨਗੇ।
- ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਵਿਚ ਮੁਹਾਰਨੀ, ਲਗਾਂ-ਮਾਤਰਾਂ, ਸਵਰ ਅਤੇ ਵਿਅੰਜਨ ਦੀ ਪਛਾਣ ਅਤੇ ਵਰਤੋਂ ਦੁਆਰਾ ਉਨ੍ਹਾਂ ਦੀ ਸਮਝ ਨੂੰ ਵਿਕਸਿਤ ਹੋਵੇਗੀ।
- ਪੰਜਾਬੀ ਸ਼ਬਦ-ਜੋੜਾਂ ਦੀ ਜਾਣਕਾਰੀ ਹਾਸਿਲ ਕਰਕੇ ਉਹ ਸ਼ੁੱਧ ਪੰਜਾਬੀ ਲਿਖਣ-ਪੜ੍ਹਨ ਦੇ ਸਮਰੱਥ ਹੋਣਗੇ।
- ਉਹ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੇ ਵਿਆਕਰਨ ਪ੍ਰਬੰਧ ਦੀ ਜਾਣਕਾਰੀ ਹਾਸਿਲ ਕਰਨਗੇ।

ਪਾਠ-ਕ੍ਰਮ

ਭਾਗ-ਪਹਿਲਾ

(ੳ) ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਤੇ ਗੁਰਮੁਖੀ ਲਿਪੀ :

ਨਾਮਕਰਣ ਤੇ ਸੰਖੇਪ ਜਾਣ-ਪਛਾਣ: ਗੁਰਮੁਖੀ ਵਰਣਮਾਲਾ, ਅੱਖਰ ਕ੍ਰਮ, ਸਵਰ ਵਾਹਕ (ਓ, ਅ, ੲ), ਲਗਾਂ-ਮਾਤਰਾਂ, ਪੈਰ ਵਿਚ ਬਿੰਦੀ ਵਾਲੇ ਵਰਨ, ਪੈਰ ਵਿਚ ਪੈਣ ਵਾਲੇ ਵਰਨ, ਬਿੰਦੀ, ਟਿੱਪੀ, ਅੱਧਕ

(ਅ) ਸਿਖਲਾਈ ਤੇ ਅਭਿਆਸ

ਭਾਗ-ਦੂਜਾ

ਗੁਰਮੁਖੀ ਆਰਥੋਗਰਾਫੀ ਅਤੇ ਉਚਾਰਨ :

ਸਵਰ, ਵਿਅੰਜਨ : ਮੁਢਲੀ ਜਾਣ-ਪਛਾਣ ਅਤੇ ਉਚਾਰਨ, ਮੁਹਾਰਨੀ, ਲਗਾਂ-ਮਾਤਰਾਂ ਦੀ ਪਛਾਣ

ਭਾਗ-ਤੀਜਾ

ਪੰਜਾਬੀ ਸ਼ਬਦ-ਜੋੜ : ਮੁਕਤਾ (ਦੋ ਅੱਖਰਾਂ ਵਾਲੇ ਸ਼ਬਦ, ਤਿੰਨ ਅੱਖਰਾਂ ਵਾਲੇ ਸ਼ਬਦ), ਸਿਹਾਰੀ ਵਾਲੇ ਸ਼ਬਦ, ਬਿਹਾਰੀ ਵਾਲੇ ਸ਼ਬਦ, ਔਂਕੜ ਵਾਲੇ ਸ਼ਬਦ, ਦੁਲੈਂਕੜ ਵਾਲੇ ਸ਼ਬਦ, ਲਾਂ ਵਾਲੇ ਸ਼ਬਦ, ਦੁਲਾਵਾਂ ਵਾਲੇ ਸ਼ਬਦ, ਹੋੜੇ ਵਾਲੇ ਸ਼ਬਦ, ਕਨੌੜੇ ਵਾਲੇ ਸ਼ਬਦ, ਲਗਾਖਰ (ਬਿੰਦੀ, ਟਿੱਪੀ, ਅੱਧਕ) ਵਾਲੇ ਸ਼ਬਦ

ਭਾਗ-ਚੌਥਾ

ਸ਼ੁੱਧ-ਅਸ਼ੁੱਧ ਸ਼ਬਦ

B.Sc. (Information Technology) Semester – I

BPHC-1104: PUNJAB HISTORY & CULTURE (From Earliest Times to C 320)
(Special Paper in lieu of Punjabi compulsory)
(For those students who are not domicile of Punjab)

Time: 3 Hours **Total. Marks: 50**
Credit Hours (per week):4 Total Hours:60 **Theory: 37**
Internal Assessment: 13

Instructions for the Paper Setter:
The question paper consists of five units: I, II, III, IV and V. Units I, II, III and IV will have two questions each. Each question carries 8 marks. The students are to attempt one question from each unit approximately in 800 words. Unit-V consists of 7 short answer type questions to be set from the entire syllabus. Students are to attempt any 5 questions in about 20 words each. Each question carries 1 mark.

Note: The examiner is to set the question paper in two languages: English & Hindi.

Course Objectives:
1. The main objective of this course is to educate the history and culture of the Ancient Punjab to the students who are not domicile of the Punjab.
2. It aims to familiarize these students with the physical features of ancient Punjab and its impact on its history and culture.
3. It also provides them information about the different sources to construct the history and culture of the ancient Punjab.
4. The course intends to provide knowledge of social, economic, religious life of the Harrapan civilization, Indo-Aryans, teachings and impact of Jainism and Buddhism in the Punjab.

UNIT-I

1. Physical features of the Punjab and impact on history.
2. Sources of the ancient history of Punjab.

UNIT-II

3. Harappan Civilization: Town planning; social, economic and religious life of the Indus Valley People.
4. The Indo-Aryans: Original home and settlement in Punjab.

UNIT-III

5. Social, Religious and Economic life during Rig Vedic Age.
6. Social, Religious and Economic life during later Vedic Age.

UNIT-IV

7. Teachings and impact of Buddhism.
8. Jainism in the Punjab.

References:-

1. L. Joshi (ed), History and Culture of the Punjab, Art-I, Patiala, 1989 (3rd edition)

2. L.M. Joshi and Fauja Singh (ed), History of Punjab, Vol.I, Patiala 1977.
3. Budha Parkash, Glimpses of Ancient Punjab, Patiala, 1983.
4. B.N. Sharma, Life in Northern India, Delhi. 1966.

Course Outcomes:

After completion of the course, the students will be able to learn:

CO-1	The history and culture of the Ancient Punjab.
CO-2	Physical features of ancient Punjab.
CO-3	The sources of the history of the Punjab.
CO-4	Social, economic, religious life of the Harrapan civilization and Vedic-Aryans.
CO-5	Teachings and impact of Jainism and Buddhism in the Punjab.

B.Sc. (Information Technology) Semester – I

BIT 114P (Practical)

Credit Hours (per week):8 **Max. Marks: 75**
Total Hours:120 **Practical Marks: 56**
Practical Internal Assessment Marks: 19

Course Objectives:

1.	Give students an in-depth understanding of why computers are essential components in business, education and society.
2.	Introduce the fundamentals of computing devices and reinforce computer vocabulary, particularly with respect to personal use of computer hardware and software, the Internet, and mobile computing.
3.	Provide hands-on use of Microsoft Office applications Word, Excel and Power Point. Completion of the assignments will result in MS Office applications knowledge and skills.
4.	The primary goal is to develop the programming skills in C.
5.	To get good knowledge of procedural language approach so that students can makes of aware in the later stage of their course.

Lab: PC Computing and C Language

Course Outcomes:

CO-1.	Understand the basic terminology of computers.
CO-2.	Understand the fundamental hardware components that make up a computer's hardware and the role of each of these components.
CO-3.	Understand the difference between an operating system and an application program, and what each is used for in a computer.
CO-4.	Describe some examples of computers and state the effect that the use of computer technology has had on some common products.
CO-5.	Identify the applications of computer in daily life.
CO-6.	Understand the practical concepts of MSWord, MS Excel and MS PowerPoint.
CO-7.	Develop programming ability in C Language.

B.Sc. (Information Technology) Semester – I
Course Code: ZDA111
Course Title- Drug Abuse: Problem, Management and Prevention
PROBLEM OF DRUG ABUSE
(Compulsory for all Under Graduate Classes)

Credit Hours (per week): 1.5 hrs.
Total Hours: 22.5 hrs.
Max. Marks: 50

Instructions for the Paper Setters:

Section–A: (15 Marks): It will consist of five short answer type questions. Candidates will be required to attempt three questions, each question carrying 05 marks. Answer to any of the questions should not exceed two pages.

Section–B: (20 Marks) It will consist of four essay type questions. Candidates will be required to attempt two questions, each question carrying 10 marks. Answer to any of the questions should not exceed four pages.

Section–C: (15 Marks) It will consist of two questions. Candidate will be required to attempt one question only. Answer to the question should not exceed 5 pages.

Course Objectives

The course aims to:

CO-1.	Generate the awareness against drug abuse.
CO-2.	Describe a variety of models and theories of addiction and other problems related to substance abuse.
CO-3.	Describe the behavioral, psychological, physical health and social impact of psychoactive substances.
CO-4.	Provide culturally relevant formal and informal education programs that raise awareness and support for substance abuse prevention and the recovery process.
CO-5.	Describe factors that increase likelihood for an individual, community or group to be at risk of substance use disorders.

UNIT–I

- **Meaning of Drug Abuse**

  Meaning, Nature and Extent of Drug Abuse in India and Punjab.

UNIT-II

- **Consequences of Drug Abuse for:**

  Individual : Education, Employment and Income.

  Family : Violence.

  Society : Crime.

  Nation : Law and Order problem.

UNIT-III

- **Management of Drug Abuse**

Medical Management: Medication for treatment and to reduce withdrawal effects.

UNIT-IV

- Psychiatric Management: Counseling, Behavioral and Cognitive therapy.
- Social Management: Family, Group therapy and Environmental Intervention.

References:

1. Ahuja, Ram (2003), Social Problems in India, Rawat Publication, Jaipur.
2. Extent, Pattern and Trend of Drug Use in India, Ministry of Social Justice and Empowerment, Government of India, 2004.
3. Inciardi, J.A. 1981. The Drug Crime Connection. Beverly Hills: Sage Publications. 23
4. Jasjit Kaur Randhawa & Samreet Randhawa, "Drug Abuse-Problem, Management & Prevention", KLS, ISBN No. 978-81-936570-6-5, (2018).
5. Jasjit Kaur Randhawa & Samreet Randhawa, "Drug Abuse Problem, Management & Prevention", KLS, ISBN No. 978-81-936570-8-9, (2019).
6. Jasjit Kaur Randhawa & Samreet Randhawa, "ਡਰੱਗਜ਼ ਦੁਰਵਰਤੋਂ-(ਨਸ਼ਾਖੋਰੀ) ਸਮੱਸਿਆ, ਪ੍ਰਬੰਧਨ ਅਤੇ ਰੋਕਥਾਮ", KLS, ISBN No. 978-81-936570-7-1, (2018).
7. Jasjit Kaur Randhawa, "Drug Abuse -Management & Prevention", KLS, ISBN No. 978-93-81278-80-2, (2018).
8. Kapoor. T. (1985) Drug epidemic among Indian Youth, New Delhi: Mittal Pub.
9. Modi, Ishwar and Modi, Shalini (1997) Drugs: Addiction and Prevention, Jaipur: Rawat Publication.
10. National Household Survey of Alcohol and Drug abuse. (2003) New Delhi, Clinical Epidemiological Unit, All India Institute of Medical Sciences, 2004.
11. Rama Gandotra & Jasjit Kaur Randhawa, "ਡਰੱਗਜ਼ ਦੁਰਵਰਤੋਂ-(ਨਸ਼ਾਖੋਰੀ) ਪ੍ਰਬੰਧਨ ਅਤੇ ਰੋਕਥਾਮ", KLS, ISBN No. 978-93-81278-87-1, (2018).
12. Sain, Bhim 1991, Drug Addiction Alcoholism, Smoking obscenity New Delhi: Mittal Publications.
13. Sandhu, Ranvinder Singh, 2009, Drug Addiction in Punjab: A Sociological Study. Amritsar: Guru Nanak Dev University.
14. Singh, Chandra Paul 2000. Alcohol and Dependence among Industrial Workers: Delhi: Shipra.
15. Sussman, S and Ames, S.L. (2008). Drug Abuse: Concepts, Prevention and Cessation, Cambridge University Press.

16. World Drug Report 2010, United Nations office of Drug and Crime.

17. World Drug Report 2011, United Nations office of Drug and Crime.

Course Outcomes:

The students will be able:

CO-1.	To describe issues of cultural identity, ethnic background, age and gender in prevention, treatment and recovery.
CO-2.	To describe warning sign, symptoms, and the course of substance use disorders.
CO-3.	To describe principles and philosophy of prevention, treatment and recovery.
CO-4.	To describe current and evidenced-based approaches practiced in the field of addictions.

B.Sc. (Information Technology)
Semester-II

Sr. No.	Paper Code	Paper Name	Marks				Page No.
			Theory	Practical	Internal Assessment	Total Marks	
1	BCSE-1222	Communication Skills in English	37	-	13	50	209-210
2	BHPB-1201/BPBI-1202/BPHC-1204	Punjabi/Basic Punjabi (Mudhli Punjabi) (Compulsory) / Punjab History & Culture	37	-	13	50	211-214
3	BIT-121	Principles of Digital Electronics	56	-	19	75	215-216
4	BIT-122	Introduction to Programming-C++	56	-	19	75	217-218
5	BIT-123	Numerical Methods & Statistical Techniques	56	-	19	75	219-220
6	BIT-124P	Practical- C++Programming Language	-	56	19	75	221-222
7	ZDA121	*Drug Abuse: Problem, Management and Prevention (Compulsory Paper)	37		13	50	223-224

- **Marks of Paper-VII will not be included in the Total Marks**

B.Sc. (Information Technology) Semester – II
BCSE-1222: COMMUNICATION SKILLS IN ENGLISH

Time: 3 Hours **Max. Marks: 50**
Credit Hours (per week):4 **Total Hours:60**
Theory Marks: 37 **Internal Assessment: 13**
Suggested Pattern of Question Paper:
The question paper will consist of Seven skill–oriented questions from Listening and Speaking Skills. The first 6 Questions carry 5 marks each. The 7th Question carries 7 marks. The questions shall be phrased in a manner that students know clearly what is expected of them. There will be internal choice wherever possible.

i) Making summary/ précis or paraphrasing of an idea of a given passage.
ii) Writing a paragraph of expository or argumentative nature of a given topic.
iii) Interpretation of a given data, chart, diagram etc and making a brief report.
iv) Transcoding (given dialogue to a prose or given prose to dialogue).
v) Draft an Advertisement for a given Product and E-mail Writing.
vi) Do as directed Change of voice Units 42-46 (6X5= 30Marks)
vii) Translation from Vernacular (Punjabi/ Hindi) to English (Isolated Sentences)1X7 = 7Marks)

Course Objectives:

1.	Define an understand communication and the communication process.
2.	Practice active listening.
3.	Identify the modes of communication.
4.	Two sports speaker and listener to enhance two-way process.

Course Contents:

3. **Listening Skills:** Barriers to listening; effective listening skills; feedback skills, attending telephone calls; note taking.
   Activities:
   b) Listening exercises – Listening to conversation, speech/ lecture and taking notes.
4. **Speaking and Conversational Skills**: Components of a meaningful and easy conversation; understanding the cue and making appropriate responses; forms of polite speech; asking and providing information on general topics, situation based Conversation in English; essentials of Spoken English
   Activities:

d) Conversation; dialogue and speech
e) Oral description or explanation of a common object, situation or concept.
f) Interviews and group discussion

Recommended Books:
Murphy's English Grammar (by Raymond Murphy) CUP

Prescribed Book:
1.Oxford Guide to Effective Writing and Speaking by John Seely.
2. The Written Word by Vandana R Singh, Oxford University Press

Course Outcomes:

CO-1.	Students will improve their speaking ability in English both in terms of valency and comprehensibility.
CO-2.	Students will give oral presentations and receive feedback on their performance.
CO-3.	IT enhance and development the two way process which is helpful to establish healthy relationships among the speakers and the listeners

B.Sc. (Information Technology) Semester – II

BHPB-1201:ਲਾਜ਼ਮੀ ਪੰਜਾਬੀ

ਸਮਾਂ : 3 ਘੰਟੇ ਕ੍ਰੈਡਿਟ ਪ੍ਰਤੀ ਹਫਤਾ : 04
ਕੁੱਲ ਘੰਟੇ : 60 ਥਿਊਰੀ ਅੰਕ : 37, ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ : 13, ਕੁੱਲ ਅੰਕ : 50

ਅੰਕ-ਵੰਡ ਅਤੇ ਪ੍ਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

- ਸਿਲੇਬਸ ਦੇ ਚਾਰ ਭਾਗ ਹਨ ਪਰ ਪ੍ਰਸ਼ਨ-ਪੱਤਰ ਦੇ ਪੰਜ ਭਾਗ ਹੋਣਗੇ। ਪਹਿਲੇ ਚਾਰ ਭਾਗਾਂ ਵਿਚ 02-02 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰੇਕ ਭਾਗ ਵਿਚੋਂ 01-01 ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਲਾਜ਼ਮੀ ਹੋਵੇਗਾ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ (08) ਅੰਕ ਹੋਣਗੇ। ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਪੰਜਵੇਂ ਭਾਗ ਵਿਚ ਸਾਰੇ ਸਿਲੇਬਸ ਵਿਚੋਂ 01-01 ਅੰਕ ਦੇ ਛੇ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ, ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ 05 ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ ਦੇਣਾ ਲਾਜ਼ਮੀ ਹੋਵੇਗਾ। ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ-ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।
  ਨੋਟ: ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ 13 ਅੰਕਾਂ ਦੀ ਹੈ, ਜੋ ਕਾਲਜ ਵੱਲੋਂ ਨਿਰਧਾਰਿਤ ਦਿਸ਼ਾ ਨਿਰਦੇਸ਼ਾਂ ਅਨੁਸਾਰ ਥਿਊਰੀ ਅੰਕਾਂ ਤੋਂ ਵੱਖਰੀ ਹੋਵੇਗੀ। ਇਸ ਪੇਪਰ ਦੇ ਕੁੱਲ ਅੰਕ 37+13 = 50 ਹਨ।

ਕੋਰਸ ਦਾ ਉਦੇਸ਼ Course Objective

- ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਸਾਹਿਤਕ ਰੁਚੀਆਂ ਪੈਦਾ ਕਰਨਾ।
- ਆਲੋਚਨਾਤਮਕ ਰੁਚੀਆਂ ਨੂੰ ਵਿਕਸਤ ਕਰਨਾ।
- ਭਾਸ਼ਾਈ ਗਿਆਨ ਵਿਚ ਵਾਧਾ ਕਰਨਾ।

ਪਾਠ-ਕ੍ਰਮ ਨਤੀਜੇ Course Outcomes (COs)

- ਵਿਦਿਆਰਥੀ ਦੀ ਸੋਚ-ਸਮਝ ਵਿਕਸਤ ਹੋਵੇਗੀ।
- ਉਸ ਅੰਦਰ ਸਾਹਿਤਕ ਰੁਚੀਆਂ ਪ੍ਰਫਲਿੱਤ ਹੋਣਗੀਆਂ।
- ਉਸ ਅੰਦਰ ਸਾਹਿਤ ਸਿਰਜਣਾ ਦੀ ਸੰਭਾਵਨਾ ਵਧੇਗੀ।
- ਉਹ ਸੰਬੰਧਿਤ ਵਿਸ਼ੇ ਦਾ ਗਹਿਨ ਅਧਿਐਨ ਕਰਨ ਦੇ ਸੁਯੋਗ ਹੋਵੇਗਾ।
- ਉਹ ਭਾਸ਼ਾਈ ਬਣਤਰ ਤੋਂ ਜਾਣੂ ਹੋਵੇਗਾ।

ਪਾਠ-ਕ੍ਰਮ

ਭਾਗ-ਪਹਿਲਾ

ਸਾਹਿਤ ਦੇ ਰੰਗ, ਡਾ. ਮਹਿਲ ਸਿੰਘ (ਸੰਪਾ.), ਰਵੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।
ਭਾਗ ਦੂਜਾ - ਵਾਰਤਕ ਅਤੇ ਰੇਖਾ-ਚਿੱਤਰ, ਡਾ. ਪਰਮਿੰਦਰ ਸਿੰਘ, ਡਾ. ਭੁਪਿੰਦਰ ਸਿੰਘ ਅਤੇ ਡਾ. ਕੁਲਦੀਪ ਸਿੰਘ ਢਿੱਲੋਂ (ਸਹਿ ਸੰਪਾ.)
(ਵਾਰਤਕ ਭਾਗ ਵਿਚੋਂ ਸਾਰ/ਵਿਸ਼ਾ-ਵਸਤੂ। ਰੇਖਾ-ਚਿੱਤਰ ਭਾਗ ਵਿਚੋਂ ਸਾਰ/ਨਾਇਕ ਬਿੰਬ)

ਭਾਗ-ਦੂਜਾ

ਇਤਿਹਾਸਿਕ ਯਾਦਾਂ
ਸ. ਸ. ਅਮੋਲ (ਸੰਪਾ.), ਪੰਜਾਬੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।
(ਨਿਬੰਧ 7 ਤੋਂ 12 ਤਕ ਸਾਰ/ ਵਿਸ਼ਾ-ਵਸਤੂ/ਸ਼ੈਲੀ)

ਭਾਗ-ਤੀਜਾ

(ੳ) ਦਫ਼ਤਰੀ ਚਿੱਠੀ ਪੱਤਰ
(ਅ) ਮੁਹਾਵਰੇ ਅਤੇ ਅਖਾਣ

ਭਾਗ-ਚੌਥਾ

(ੳ) ਸ਼ਬਦ-ਬਣਤਰ ਅਤੇ ਸ਼ਬਦ-ਰਚਨਾ - ਪਰਿਭਾਸ਼ਾ ਅਤੇ ਮੁੱਢਲੇ ਸੰਕਲਪ
(ਅ) ਸ਼ਬਦ-ਸ਼੍ਰੇਣੀਆਂ

B.Sc. (Information Technology) Semester – II

BPBI-1202
ਮੁਢਲੀ ਪੰਜਾਬੀ
(In Lieu of Compulsory Punjabi)

ਸਮਾਂ : 3 ਘੰਟੇ ਕ੍ਰੈਡਿਟ ਪ੍ਰਤੀ ਹਫਤਾ : 04
ਕੁੱਲ ਘੰਟੇ : 60 ਥਿਊਰੀ ਅੰਕ : 37, ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ : 13, ਕੁੱਲ ਅੰਕ : 50

ਅੰਕ-ਵੰਡ ਅਤੇ ਪ੍ਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

- ਭਾਗ ਪਹਿਲਾ ਵਿਚੋਂ ਚਾਰ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਤਿੰਨ ਪ੍ਰਸ਼ਨਾਂ ਦਾ ਉੱਤਰ ਦੇਣਾ ਲਾਜ਼ਮੀ ਹੈ। ਹਰ ਪ੍ਰਸ਼ਨ ਦੇ ਚਾਰ-ਚਾਰ ਅੰਕ ਹਨ। ਭਾਗ ਦੂਸਰਾ ਵਿਚੋਂ ਦੋ-ਦੋ ਅੰਕ ਦੇ ਪੰਜ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਸਾਰੇ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹਨ। ਭਾਗ ਤੀਸਰਾ ਵਿਚੋਂ ਚਾਰ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਲਾਜ਼ਮੀ ਹਨ। ਭਾਗ ਚੌਥਾ ਵਿਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨਾ ਹੋਵੇਗਾ।

  ਨੋਟ: ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ 13 ਅੰਕਾਂ ਦੀ ਹੈ, ਜੋ ਕਾਲਜ ਵੱਲੋਂ ਨਿਰਧਾਰਿਤ ਦਿਸ਼ਾ ਨਿਰਦੇਸ਼ਾਂ ਅਨੁਸਾਰ ਥਿਊਰੀ ਅੰਕਾਂ ਤੋਂ ਵੱਖਰੀ ਹੋਵੇਗੀ। ਇਸ ਪੇਪਰ ਦੇ ਕੁਲ ਅੰਕ 37+13 = 50 ਹਨ।

ਕੋਰਸ ਦਾ ਉਦੇਸ਼ Course Objective

- ਵਿਦਿਆਰਥੀ ਅੰਦਰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੀ ਸਮਝ ਵਿਕਸਤ ਕਰਨਾ।
- ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੇ ਵਿਆਕਰਨਕ ਪ੍ਰਬੰਧ ਸੰਬੰਧੀ ਗਿਆਨ ਕਰਾਉਣਾ।
- ਸਿਖਲਾਈ ਤੇ ਅਭਿਆਸ ਦੁਆਰਾ ਪੰਜਾਬੀ ਭਾਸ਼ਾ 'ਤੇ ਪਕੜ ਵਧਾਉਣਾ।

ਪਾਠ-ਕ੍ਰਮ ਨਤੀਜੇ Course Outcomes (COs)

- ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ ਬਾਰੇ ਸਮਝ ਹੋਰ ਵਿਕਸਿਤ ਹੋਵੇਗੀ।
- ਉਹ ਪੰਜਾਬੀ ਸ਼ਬਦ-ਬਣਤਰ ਦੀ ਜਾਣਕਾਰੀ ਹਾਸਿਲ ਕਰਕੇ ਭਾਸ਼ਾਈ ਗਿਆਨ ਨੂੰ ਵਿਕਸਿਤ ਕਰਨਗੇ।
- ਪੰਜਾਬੀ ਸ਼ਬਦ-ਰਚਨਾ ਸੰਬੰਧੀ ਜਾਣਕਾਰੀ ਉਨ੍ਹਾਂ ਦੇ ਗਿਆਨ ਵਿਚ ਵਾਧਾ ਕਰੇਗੀ।

ਪਾਠ-ਕ੍ਰਮ

ਭਾਗ-ਪਹਿਲਾ

ਪੰਜਾਬੀ ਸ਼ਬਦ-ਬਣਤਰ :

ਧਾਤੂ, ਵਧੇਤਰ (ਅਗੇਤਰ, ਮਧੇਤਰ, ਪਿਛੇਤਰ), ਪੰਜਾਬੀ ਕੋਸ਼ਗਤ ਸ਼ਬਦ ਅਤੇ ਵਿਆਕਰਨਕ ਸ਼ਬਦ

ਭਾਗ-ਦੂਜਾ

ਪੰਜਾਬੀ ਸ਼ਬਦ-ਪ੍ਰਕਾਰ :

(ੳ) ਸੰਯੁਕਤ ਸ਼ਬਦ, ਸਮਾਸੀ ਸ਼ਬਦ, ਦੋਜਾਤੀ ਸ਼ਬਦ, ਦੋਹਰੇ/ਦੁਹਰੁਕਤੀ ਸ਼ਬਦ ਅਤੇ ਮਿਸ਼ਰਤ ਸ਼ਬਦ

(ਅ) ਸਿਖਲਾਈ ਤੇ ਅਭਿਆਸ

ਭਾਗ-ਤੀਜਾ

ਪੰਜਾਬੀ ਸ਼ਬਦ-ਰਚਨਾ :

ਇਕ-ਵਚਨ/ਬਹੁ-ਵਚਨ, ਲਿੰਗ-ਪੁਲਿੰਗ, ਬਹੁਅਰਥਕ ਸ਼ਬਦ, ਸਮਾਨਅਰਥਕ ਸ਼ਬਦ, ਬਹੁਤੇ ਸ਼ਬਦਾਂ ਲਈ ਇਕ ਸ਼ਬਦ, ਸ਼ਬਦ ਜੁੱਟ, ਵਿਰੋਧਅਰਥਕ ਸ਼ਬਦ, ਸਮਨਾਮੀ ਸ਼ਬਦ

ਭਾਗ-ਚੌਥਾ

ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ

ਖਾਣ-ਪੀਣ, ਸਾਕਾਦਾਰੀ, ਰੁੱਤਾਂ, ਮਹੀਨਿਆਂ, ਗਿਣਤੀ, ਮੌਸਮ, ਬਾਜ਼ਾਰ, ਵਪਾਰ, ਧੰਦਿਆਂ ਨਾਲ ਸੰਬੰਧਿਤ

B.Sc. (Information Technology) Semester – II
BPHC-1204: PUNJAB HISTORY & CULTURE (C 321 TO 1000 A.D.)
(Special Paper in lieu of Punjabi compulsory)
(For those students who are not domicile of Punjab)

Time: 3 Hours **Total. Marks: 50**
Theory: 37
Internal Assessment: 13

Instructions for the Paper Setter:
The question paper consists of five units: I, II, III, IV and V. Units I, II, III and IV will have two questions each. Each question carries 8 marks. The students are to attempt one question from each unit approximately in 800 words. Unit-V consists of 7 short answer type questions to be set from the entire syllabus. Students are to attempt any 5 questions in about 20 words each. Each questioncarries 1 mark.

Note: The examiner is to set the question paper in two languages: English & Hindi.

Course Objectives:

1.	The main objective of this course is to educate the students who are not domicile of the Punjab about the history and culture of the Ancient Punjab.
2.	It is to provide them knowledge about the social, economic, religious, cultural and political life of the peopleof the Punjab during the rule of various dynasties such as The Mauryans, The Khushans, The Guptas, The Vardhanas and other ancient ruling dynasties of the period under study.

UNIT-I

1. Punjab under Chandragupta Maurya and Ashoka.
2. The Kushans and their Contribution to the Punjab.

UNIT-II

3. The Punjab under the Gupta Emperors.
4. The Punjab under the Vardhana Emperors

UNIT-III

5. Political Developments 7th Century to 1000 A.D.
6. Socio-cultural History of Punjab from 7th Century to 1000 A.D.

UNIT-IV

7. Development of languages and Literature.
8. Development of art & Architecture.

Suggested Readings:-

1. L. Joshi (ed), History and Culture of the Punjab, Part-I, Patiala, 1989 (3rd edition)
2. L.M. Joshi and Fauja Singh (ed), History of Punjab, Vol.I, Patiala 1977.
3. Budha Parkash, Glimpses of Ancient Punjab, Patiala, 1983.
4. B.N. Sharma, Life in Northern India, Delhi. 1966.

Course Outcomes:

At the end of course students will be able to:

CO-1	The history and culture of the Punjab in Ancient Period.
CO-2	Social, economic, religious, cultural and political life of Ancient Indian dynasties.
CO-3	Political developments from 7th century to1000AD.
CO-4	Socio-cultural history of the Punjab from 7th century to1000AD.
CO-5	Language, literature, art and architecture of Ancient Punjab.

B.Sc. (Information Technology) Semester – II

BIT-121: Principles of Digital Electronics

Time: 3 Hours **Theory Marks: 56**
Credit Hours (per week):4 **Total Marks: 75**
Total Hours:60 **Theory Internal Assessment M: 19**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks**.

Course Objectives:

1.	To familiarize the concept of various number systems.
2.	To introduce the concept of logic gates and logic families.
3.	To acquire the knowledge of the minimization techniques in digital electronics.
4.	To design combinational circuits and sequential circuits using logic gates.
5.	To impart knowledge of how to design registers in digital electronics.
6.	To understand the concept of digital logic levels.

UNIT-I

1. Number Systems: Introduction to Decimal, Binary, Octal and Hexadecimal Numbers. Complements. Signed Binary Numbers (Arithmetic Addition & Subtraction), Binary Codes (BCD, Excess-3, Gray codes, ASCII), Binary Storage and Registers.
2. Boolean Algebra and Logic Gates: Basic Definitions, Postulates and theorems of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, De-Morgan's Theorem Reducing Boolean expressions, Digital Logic Gates: (AND, OR NOT, NAND, NOR, EX-OR, EX- NOR), Implementations using Basic Gates, Universal Gates
3. Minimization Techniques: Canonical and Standard forms SOP and POS of Boolean functions, K-Maps simplifications up to Five-Variable Map, Sum of Products and Product of Sums Simplification, Don't-Care Conditions.
4. Combinational Logic: Half Adder and Full Adder, Binary Adder and Subtractor, Decimal Adder, Comparator, Decoders, Encoders, Multiplexers.

UNIT-II

5. Synchronous Sequential Logic: Sequential Circuits, Latches, Flip-Flops (SR, JK, JK Master Slave, D and T-type). Negative edge and Positive edge triggered clocks

6. Registers and Counters: Shift Registers (Serial-in Serial-out, Serial-in Parallel-out, Parallel-in Serial-out, Parallel-in Parallel-out), Ripple Counters, Synchronous and Asynchronous Counters, Mod counters up/down counters.

7. Memory and Programmable Logic: Introduction, Random-Access Memory, Memory Decoding, Error Detection and Correction, Read-Only Memory, Programmable Array Logic.

8. Computer Concepts: Basic Computer System, concepts of hardware and software, Operating Systems, Microcontrollers and Embedded Systems., Digital Signal Processing, Digital Signal Processor (DSP).

References:

1. Integrated Electronics by Millman, Halkias McGraw Hill.
2. Malvino: Digital Computer Electronics, McGraw Hill.
3. D.A. Hodges & H.G. Jackson, Analysis and Design of Integrated Circuits, International, 1983.
4. Joph. F. Wakerley, Digital Principles and Practices.
5. Ujjenbeck, John: Digital Electronics: A Modern Approach, Prentice Hall, 1994.
6. Mano, M. Morris: Digital Logic and Computer Design, Edition, 1993
7. Electronics by R.K Gaur.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1	Gain knowledge of different types of number systems and their conversions in digital electronics.
CO-2	Use Boolean algebra to minimize and simplify boolean expressions
CO-3	Illustrate realization of SOP and POS forms
CO-4	Design of various combinational circuits using logic gates
CO-5	Design and develop sequential circuits using flip flops.

B.Sc. (Information Technology) Semester – II

BIT-122: Introduction to Programming - C++

Time: 3 Hours **Max. Marks: 75**
Credit Hours (Per Week):4 **Theory Marks: 56**
Total Hours:60 **Theory Internal Assessment Marks: 19**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks**.

Course Objectives:

1.	To learn the fundamental programming concepts and methodologies which are essential to building good C++ programs.
2.	To practice the fundamental programming methodologies in the C++ programming language via laboratory experiences. Microsoft Visual Studio is the programming environment that will be used.
3.	To code, document, test, and implement a well-structured, robust computer program using the C++ programming language.
4.	To write reusable modules (collections of functions).

UNIT-I

1. **Getting Started:**. Introduction, A brief history of C++, Variables , constants, Expression, Statements, Comments and keywords of C++, Operators in C++: Arithmetic, Relational, Logical,Assignment, Increment/Decrement, Conditional, Precedence of Operators , Data type, Type Conversion, library function.
2. **Input / Output Statements** : Inputting using in and outputting using cout statements. Preprocessor directives, Basic program construction. A Complete C++ Program: Invoking Turbo C++, naming your program, using the editor, saving your program, compiling and linking, running the program. Errors : Compiler, linker and runtime. Other IDE Features: Compiling and linking shortcut exiting from IDE, examining files, opening an existing file, DOS shell
3. **Decision Making and Looping Statement :** If Statement, If-else statement, nesting of if statement, switch statement, conditional operator statement.

While loop, do loop, for loop, nesting of loops, break and continue statement, go to statement.
4. **Arrays :** Defining an array, array type, array elements, Accessing and initializing elements of array, Programming of C++ with array, String handling, array of strings.

UNIT-II

5. Functions : Definition of function, Declaring function, Local, global variables, execution of function, Passing argument to function, Return values Reference arguments, Overloading functions, Inline function, friend function and default parameter., Storage classes.
6. **Structures:** A simple structure, specifying the structure, defining a structure variable, Accessing Structure member, Other structure features. Structure within structure. Structure and classes. Array of structures.
7. Object Oriented Programming Objects & Classes, Constructor & Destructor, Operator overloading: Overloading unary operators, Overloading binary operators, Data conversion, Pitfalls operator overloading and conversion.
8. Inheritance Derived class and Base Class, Derived Class Constructors, Overriding member functions, Inheritance in the English distances class, class hierarchies, Public and Private Inheritance, Level of inheritance.
9. Polymorphism: Problems with single inheritance, Multiple inheritance, Virtual Functions**,** Pure Virtual Functions.

References:

1. C++ & Graphics by Vijay Mukhi's
2. Turbo C++ by Robert Lafore.
3. C++ Programming Language by Schaum's outline series.
4. Object –Oriented Programming with C++ by E. Balagursamy, 2017 edition.
5. C++, The Complete Reference by Herbert Schildt.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Use the fundamentals of C programming in trivial problem solving.
CO-2.	Enhance skill on problem solving by constructing algorithms.
CO-3.	Identify solution to a problem and apply control structures and user defined functions for solving the problem.
CO-4.	Apply skill of identifying appropriate programming constructs for problem Solving.

B.Sc. (Information Technology) Semester – II

BIT-123: Numerical Methods and Statistical Techniques

Time: 3 Hours **Total Marks: 75**
Credit Hours (Per Week):4 **Theory Marks: 56**
Total Hours:60 **Theory Internal Assessment M: 19**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks**.
Course Objectives:

1.	To enhance the problem solving skills of engineering students using an extremely powerful problem solving tool namely numerical methods.
2.	This will help students choose, develop and apply the appropriate numerical techniques for your problem, interpret the results, and assess accuracy.
3.	The problems cover **I.** Systems of linear equations; linear least squares problems **II.** Interpolation and approximation.

UNIT-I

Introduction:
1. Numerical Methods, Numerical methods versus numerical analysis, Errors and Measures of Errors.
2. Non–linear Equations, iterative Solutions, Multiple roots and other difficulties, Interpolation methods, Methods of bi–section, False position method, Newton Raphson – method.
3. Simultaneous Solution of Equations, Gauss Elimination Method, Gauss Jordan Method
4. Numerical Integration and different Trapezoidal Rule, Simpson's 3/8 Rule.
5 Interpolation and Curve Fitting, Lagrangian Polynomials, Newton's Methods: Forward Difference Method, Backward Difference Method Divided Difference Method.
6 Least square fit linear trend, Non–linear trend.
$Y = ax^b$
$Y = ab^x$

$Y = ae^x$
Polynomial fit: $Y = a+bx+cx^2$

UNIT-II

Statistical Techniques:
1. Measure of Central Tendency, Mean Arithmetic, Mean Geometric, Mean Harmonic, Mean, Median, Mode.
2. Measure of Dispersion, Mean Deviation, Standard Deviation, Co–efficient of Variation.

References:

1. V. Rajaraman: Computer Oriented Numerical Methods, Prentice Hall of India Private Ltd., New Delhi.
2. B.S. Grewal, Numerical Methods for Engineering, Sultan Chand Publication.
3. V. Rajaraman: Computer Oriented Numerical Methods, Prentice Hall of India Private Ltd., New Delhi.
4. S.P Gupta, Statistical Methods, Sultan Chand & Sons Publications.

Course Outcomes:

On completion of this course students will able to:

CO-1.	Understand numerical techniques to find the roots of non-linear equations and solution of system of linear equations.
CO-2.	Apply numerical methods to obtain approximate solutions to mathematical problems.
CO-3.	Understand the difference operators and the use of interpolation.
CO-4.	Analyses and evaluate the accuracy of common numerical methods
CO-5.	Interpret calculation and errors in numerical method.
CO-6.	Writes mathematical solutions and their interpretation in a clear and concise manner.

B.Sc. (Information Technology) Semester – II

BIT-124P: Programming Lab- I (C++ Programming Language)

Credit Hours(per week):8 **Total Marks: 75**
Total Hours:120 **Practical Marks: 56**
Practical Internal Assessment M: 19

Course Objectives:

1.	To understand how C++ improves C with object-oriented features.
2.	To learn how to write inline functions for efficiency and performance.
3.	To know the syntax and semantics of the C++ programming language.
4.	To learn how to design C++ classes for code reuse.
5.	To know how to implement copy constructors and class member functions.
6.	To understand the concept of data abstraction and encapsulation.
7.	To learn how to overload functions and operators in C++.
8.	To understand how containment and inheritance promote code reuse in C++.
9.	To learn how inheritance and virtual functions implement dynamic binding with polymorphism.
10.	To understand how to design and implement generic classes with C++ templates.
11.	To learn how to use exception handling in C++ programs.

Practical- Implementation of Numerical Methods and Statistical Techniques Using C++.

Course Outcomes:

On completion of this course students will able to:

CO-1.	Use C++ more effectively.
CO-2.	Learn to think more analogously, creatively as well as comparatively.
CO-3.	Develop better software development skills in other language too.
CO-4.	Review Programming in C and become aware of the limitation of C, thereby, understand the need of the origin of C++.
CO-5.	Raise their programming level in C++to be able to apply it in the real life.
CO-6.	Get knowledge to use the concept of Object-Oriented Programming approach in their programming skills.

CO-7.	Get knowledge on the implementation of various features of C++i.e. concept of Object, Object communication, Encapsulation, Data hiding, overloading, etc.
CO-8.	Acquire in depth knowledge and develop software in C++.
CO-9.	Understand how to do programming in C++environment.
CO-10.	Understand and implement the concepts of object-oriented approach using C++.
CO-11.	Identify different class attributes, member functions, base class and derived class and their relationships among them.
CO-12.	Learn how to reuse the code using polymorphism.
CO-13.	Solve real-life existing problems using the features of C++.
CO-14.	Develop software/big and complex programs for a complex problem.
CO-15.	Implement advance features of object-oriented approach in other various language(s).

B.Sc. (Information Technology) Semester – II

Course Code: ZDA121
Course Title-DRUG ABUSE: PROBLEM, MANAGEMENT AND PREVENTION
DRUG ABUSE: MANAGEMENT AND PREVENTION
(Compulsory for all Under Graduate Classes)

Credit Hours (per week): 1.5 hrs.
Total Hours: 22.5 hrs.
Max. Marks: 50

Instructions for the Paper Setters:

Section–A: (15 Marks): It will consist of five short answer type questions. Candidates will be required to attempt three questions, each question carrying 05 marks. Answer to any of the questions should not exceed two pages.

Section–B: (20 Marks) It will consist of four essay type questions. Candidates will be required to attempt two questions, each question carrying 10 marks. Answer to any of the questions should not exceed four pages.

Section–C: (15 Marks) It will consist of two questions. Candidate will be required to attempt one question only. Answer to the question should not exceed 5 pages.

Course Objectives:

The course aim is to

CO-1.	Describe the role of family in the prevention of drug abuse.
CO-2.	Describe the role of school and teachers in the prevention of drug abuse.
CO-3.	Emphasize the role of media and educational and awareness program.
CO-4.	Provide knowhow about various legislation and Acts against drug abuse.

UNIT-I

- **Prevention of Drug abuse**

  Role of family: Parent child relationship, Family support, Supervision, Shaping values, Active scrutiny.

UNIT-II

- **School:** Counseling, Teacher as role-model, Parent-Teacher-Health Professional Coordination, Random testing on students.

UNIT-III

- **Controlling Drug Abuse**

  Media: Restraint on advertisements of drugs, advertisements on bad effects of drugs, Publicity and media, Campaigns against drug abuse, Educational and Awareness Program

UNIT-IV

- **Legislation:** NDPS Act, Statutory warnings, Policing of Borders, Checking Supply/Smuggling of Drugs, Strict enforcement of laws, Time bound trials.

References:

1. Extent, Pattern and Trend of Drug Use in India, Ministry of Social Justice and Empowerment, Government of India, 2004.
2. Gandotra, R. and Randhawa, J.K. 2018. ਡਰੱਗਜ਼ ਦੁਰਵਰਤੋਂ (ਨਸ਼ਾਖੋਰੀ) ਪ੍ਰਬੰਧਨ ਅਤ ਰੋਕਥਾਮ। Kasturi Lal & Sons, Educational Publishers, Amritsar- Jalandhar.
3. Inciardi, J.A. 1981. The Drug Crime Connection. Beverly Hills: Sage Publications.
4. Modi, Ishwar and Modi, Shalini (1997) Drugs: Addiction and Prevention, Jaipur: Rawat Publication.
5. Randhawa, J.K. and Randhawa, Samreet 2018. Drug Abuse-Management and Prevention. Kasturi Lal & Sons, Educational Publishers, Amritsar- Jalandhar.
6. Sain, Bhim 1991, Drug Addiction Alcoholism, Smoking obscenity New Delhi: Mittal Publications.
7. Sandhu, Ranvinder Singh, 2009, Drug Addiction in Punjab: A Sociological Study. Amritsar: Guru Nanak Dev University.
8. Singh, Chandra Paul 2000. Alcohol and Dependence among Industrial Workers: Delhi: Shipra. 9. World Drug Report 2011, United Nations office of Drug and Crime.
10. World Drug Report 2010, United Nations office of Drug and Crime

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Understand the importance of family and its role in drug abuse prevention.
CO-2.	Understand the role of support system especially in schools and inter-relationships between students, parents and teachers.
CO-3.	Understand impact of media on substance abuse prevention.
CO-4.	Understand the role of awareness drives, campaigns etc. in drug abuse management.
CO-5	Learn about the Legislations and Acts governing drug trafficking and Abuse in India.

B.Sc. (Information Technology)

Semester-III

Sr. No.	Paper Code	Paper Name	Marks				Page No.
			Theory	Internal Assessment	Practical	Total	
1	BIT-231	Introduction to Python	56	19	-	75	226-227
2	BIT-232	Data Structures	56	19	-	75	228-229
3	BIT-233	System Analysis & Design	56	19	-	75	230-231
4	ESL–221	Environment Studies – I (Compulsory)	37	13	-	50	232-234
5	BIT-234P	Programming Lab- I (Python Programming Language)	-	13	37	50	235
6	BIT-235P	Programming Lab – II (Data Structures)	-	07	18	25	236

B.Sc. (Information Technology) Semester – III

BIT-231: Introduction to Python

Time: 3 Hours **Max. Marks: 75**
Credit Hours (per week): **Theory Marks: 56**
Theory Internal Assessment Marks: 19

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **11 marks**. The total weightage of this section shall be **22 marks.**

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **11 marks**. The total weightage of this section shall be **22 marks**.

Course Objectives:

The main objective of this course is to help students to understand Python's basic constructs and assist them to acquire appropriate programming skills.

UNIT-I

Introduction to Python: Process of Computational Problem Solving, Python Programming Language

Data and Expressions: Literals, Variables and Identifiers, Operators, Expressions, Statements and Data Types

Control Structures: Boolean Expressions (Conditions), Logical Operators, Selection Control, Nested conditions, Debugging

Lists: List Structures, Lists (Sequences) in Python, Iterating Over Lists (Sequences) in Python

Functions: Fundamental Concepts, Program Routines, Flow of Execution, Parameters & Arguments

Iteration: While statement, Definite loops using For, Loop Patterns, Recursive Functions, Recursive Problem Solving, Iteration vs. Recursion

UNIT-II

Dictionaries: Dictionaries and Files, Looping and dictionaries, Advanced text parsing

Files: Opening Files, Using Text Files, String Processing, Exception Handling

Objects and Their Use: Introduction to Object Oriented Programming

Modular Design: Modules, Top-Down Design, Python Modules

Using Databases and SQL: Database Concepts, SQLite Manager Firefox Add-on, SQL basic summary, Basic Data modeling, Programming with multiple tables

References :

1. Python for Informatics, Charles Severance, version 0.0.7

2. Introduction to Computer Science Using Python: A Computational Problem-Solving Focus, Charles Dierbach, Wiley Publications, 2012, ISBN : 978-0-470-91204-1
3. Introduction To Computation And Programming Using Python, GUTTAG JOHN V, PHI, 2014, ISBN-13: 978-8120348660
4. Introduction to Computating& Problem Solving Through Python, Jeeva Jose and Sojan P. Lal,Khanna Publishers, 2015, ISBN-13: 978-9382609810
5. Introduction to Computing and Programming in Python, Mark J. Guzdial, Pearson Education, 2015, ISBN-13: 978-9332556591
6. Fundamentals of Python by Kenneth Lambert, Course Technology, Cengage Learning , 2015
7. Learning Python by Mark Lutz, 5th Edition, O'Reilly Media, 2013.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Acquire knowledge on Python's basic concepts, such as, Literals, Variables and Identifiers, Operators, Expressions, Statements and Data Types, Control structures, and Iterations.
CO-2.	Understand the concepts of recursion, list, and functions.
CO-3.	Develop applications using object oriented approach
CO-4.	Implement real word applications using top down approach.
CO-5.	Make database connectivity in Python programming language.

B.Sc. (Information Technology) Semester – III

BIT-232: Data Structures

Time: 3 Hours **Max. Marks: 75**
Credit Hours (per week):4 **Theory Marks: 56**
Total Hours:60 **Theory Internal Assessment Marks: 19**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **11 marks**. The total weightage of this section shall be **22 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **11 marks**. The total weightage of this section shall be **22 marks**.

Course Objectives:

1.	The main objective of this course is to help students to understand the concept of organizing and managing data in computer's memory.
2.	This course introduces different data structure techniques along with their representation in computer's memory.

UNIT-I

Basic Data Structure: Introduction to elementary Data Organization, Common Operation on Data Structures, Algorithm Complexity, Big O Notation, Time – Space tradeoff between Algorithms.
Arrays: Array Defined, Representing Arrays in Memory, Various Operations on Linear Arrays, Multidimensional Arrays.
Linked Lists: Types of Linked Lists, Representing Linked Lists in Memory, Advantages of using Linked Lists over Arrays, Various Operations on Linked Lists.
Stacks: Description of STACK structure, Implementation of Stack using Arrays and Linked Lists, Applications of Stacks – Converting Arithmetic expression from infix notation to polish and their subsequent evaluation, Quicksort Technique to sort an array.

UNIT-II

Queues: Description of queue structure, Implementation of queue using arrays and linked lists, Description of priorities of queues, Dequeues.
Trees: Description of Tree Structure and its Terminology, Binary Trees and Binary Search Trees and their representation in Memory

Sorting and Searching: Sorting Algorithms, Bubble Sort, Searching Algorithms, Linear Search and Binary Search.
Graphs: Description of Graph Structure, Implement Graphs in Memory using Adjacency Matrix, Path Matrix.

References:

1. Seymour Lipschutz, Theory and Problems of Data Structures, Schaum's Outline Series, McGraw Hill Company.
2. Tanenbaum, Data Structure using C.
3. Data Structure and Algorithms by Alfred V. John E. Hopcroft, Jeffery D. Ullman Pearson.
4. Sorenson and Trembley, "An Introduction to Data Structure with Applications, McGraw Hill, 2006 edition.

Course Outcomes:

On Completing the course, the students will be able to:	
CO-1.	Understand the concept of algorithm complexity and will acquire knowledge about mathematical notations which can be used to measure the algorithm's complexity.
CO-2.	Comprehend different data structure techniques, such as array, stacks, queue, linked list, trees, and graphs, along with the operations performed on them.
CO-3.	Understand the memory representation of the above-mentioned data structures.
CO-4.	Apply linear search and binary search techniques in real word applications to identify the particular element.
CO-5.	Get knowledge about different sorting algorithms along with their time complexities.

B.Sc. (Information Technology) Semester – III
BIT-233: System Analysis & Design

Time: 3 Hours **Max. Marks: 75**
Credit Hours (Per Week):4 **Theory Marks: 56**
Total Hours: 60 **Theory Internal Assessment Marks: 19**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks**.

Course Objectives:

1.	The objective of this course is to provide adequate understanding of systems concept, system analysis, and systems design, which would help them in having efficient and workable information system for management.
2.	To provide an understanding of the role of systems analyst.
3.	To provide an understanding of the role of system analysis and design within various systems development stages.
4.	To develop an awareness of the different approaches that might be taken to systems design. To understand the activities of the management and systems analyst, and in the overall development of system.
5.	To develop an understanding of Testing software and complying the various software quality parameters.
6.	To develop an understanding of how to migrate old data within newly developed system with the help of various techniques.

UNIT–I

System Planning and Analysis: Introduction to systems development life cycle and role of different stages. Requirement analysis, Problem definition, Feasibility Study and its importance. Information Gathering Tools, Cost Benefit Analysis, Role and responsibilities of System Analyst.

System Design: Input/Output Design, Modular and Structured Design, Tools for structured design (Data Flow Diagrams, Data Dictionary, Decision Tree, Structured English and Decision Tables) and system design considerations.

UNIT-II

System Implementation: System testing, Quality assurance, Documentation tools, Managing system implementation.

System Testing: Introduction to testing and its types

System Maintenance: Concept of maintenance and its importance, types of maintenance

References:

1. "Elements of System Analysis" – Marvin Gore and John W. Stubbe, 2003.
2. "System Analysis and Design" – Thapliyal M.P., 2002.
3. "Modern Systems Analysis & Design" – Hoffer, George and Valacich , 2001.
4. "SSAD: System Software Analysis and Design" – Mehta Subhash and Bangia Ramesh,1998.
5. "Understanding Dynamic System : Approaches to Modelling, Analysis and Design" –Dorny C. Nelson, 1993.
6. "System Analysis and Design" – Perry Edwards, 1993.
7. "Systems Analysis and Design" – Elias M. Awad, 1993.
8. "Analysis and Design of Information Systems" – James A. Senn, 1989.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Identify and describe the phases of the system development life cycle.
CO-2.	Conducts study of existing systems, develop and evaluate system requirements.
CO-3.	Make the feasibility study about the system and decide whether the system is feasible or not.
CO-4.	Use tools and techniques for process and data modeling.
CO-5.	Develop and deliver a Requirements Definition Proposal for a new system to client.

B.Sc. (Information Technology) Semester – III
Course code: ESL–221
Course Title: ENVIRONMENTAL STUDIES–I (COMPULSORY)

Credit Hours (Per Week): 2
Total Hours: 30
Maximum Marks: 50 Marks

Instructions for Paper Setters: The question paper will consist of three sections. Candidate will be required to attempt all the sections. Each unit of the syllabus should be given equal weightage of marks. Paper to be set in English, Punjabi and Hindi.

Section–A: (16 Marks): It will consist of five short answer type questions. Candidates will be required to attempt four questions, each question carrying four marks. Answer to any of the questions should not exceed two pages.

Section–B: (24 Marks): It will consist of five questions. Candidates will be required to attempt four questions, each question carrying six marks. Answer to any of the questions should not exceed four pages.

Section–C: (10 Marks): It will consist of two questions. Candidate will be required to attempt one question (carrying ten marks) only. Answer to the question should not exceed 5 pages.

Course Objectives

CO-1	The main goal of Environmental studies is to create the environmental awareness to create a safe, green and sustainable environment.
CO-2	To make students aware about the importance of ecosystem, types of ecosystem, energy flow in an ecosystem, ecological succession, food chain and food web.
CO-3	To make students aware of water conservation, global warming, consumerism and waste products. and, also about the environmental protection acts.
CO-4	Role of National Service Scheme (NSS). Health and hygiene.

UNIT-I

The Multidisciplinary Nature of Environmental Studies:

- Definition, scope & its importance.
- Need for public awareness.

Natural Resources:

- Natural resources and associated problems:

a) Forest Resources: Use of over exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.

b) Water Resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.

c) Mineral Resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

d) Food Resources: World food problems, change caused by agriculture and overgrazing, effects or modern agriculture, fertilizer-pesticide problem, salinity, case studies.

e) Energy Resources: Growing of energy needs, renewable and non-renewable energy resources, use of alternate energy sources, case studies.

ii) **f) Land Resources**: Land as a resource, land degradation, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

UNIT-II

Ecosystem:

- Concept of an ecosystem.
- Structure and function of an ecosystem.
- Producers, consumers and decomposers.
- Energy flow in the ecosystem.
- Ecological succession.
- Food chains, food webs and ecological pyramids.

Introduction, types, characteristic features, structure and function of the following ecosystems:

a. Forest ecosystem

b. Grassland ecosystem

c. Desert ecosystem

d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

UNIT-III

Social Issues and Environment:

From unsustainable to sustainable development.

Urban problems related to energy.

Water conservation, rain water harvesting, watershed management.

Resettlement and rehabilitation of people; its problems and concerns. Case studies.

Environmental ethics: Issues and possible solutions.

Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocause. Case studies.

Wasteland reclamation.

Consumerism and waste products.

Environmental Protection Act:

- Air (prevention and Control of Pollution) Act.
- Water (prevention and Control of Pollution) Act.
- Wildlife Protection Act.
- Forest Conservation Act.

Issues involved in enforcement of environmental legislation.

Public awareness.

UNIT-IV

National Service Scheme

- **Introduction and Basic Concepts of NSS:** History, philosophy, aims & objectives of NSS; Emblem, flag, motto, song, badge etc.; Organizational structure, roles and responsibilities of various NSS functionaries.
- **Health, Hygiene & Sanitation:** Definition, needs and scope of health education; Food and Nutrition; Safe drinking water, water borne diseases and sanitation (Swachh Bharat Abhiyan); National Health Programme; Reproductive health.

References/Books:

1. Agarwal, K. C. 2001. Environmental Biology, Nidhi Publications Ltd. Bikaner.
2. Bharucha, E. 2005. Textbook of Environmental Studies, Universities Press, Hyderabad.
3. Down to Earth, Centre for Science and Environment, New Delhi.
4. Jadhav, H. & Bhosale, V. M. 1995. Environmental Protection and Laws. Himalaya Pub.
5. Joseph, K. and Nagendran, R. 2004. Essentials of Environmental Studies, Pearson Education (Singapore) Pte. Ltd., Delhi.
6. Kaushik, A. & Kaushik, C. P. 2004. Perspective in Environmental Studies, New Age International (P) Ltd, New Delhi.
7. Miller, T. G. Jr. 2000. Environmental Science, Wadsworth Publishing Co.
8. Sharma, P. D. 2005. Ecology and Environment, Rastogi Publications, Meerut.
9. Booklet on Safe Driving. Sukhmani Society (Suvidha Centre), District Court Complex, Amritsar
10. Kanta, S., 2012. Essentials of Environmental Studies, ABS Publications, Jalandhar.

Course Outcomes

On Completing the course, the students will be able to:

CO-1	To learn about the sustainable environment.
CO-2	To gain the knowledge ecosystem and its functioning.
CO-3	To know about the water conservation programs like rain water harvesting and water shedding. and, to gain knowledge of environmental (air, water and pollution) protections acts.
CO-4	To know about the role and importance of NSS– a volunteer organization, in making up a better environment and to maintain better health and hygiene.

B.Sc. (Information Technology) Semester – III
BIT-234P
(Programming Lab-I)

Credit Hours (Per Week):
Max. Marks: 50
Practical Marks: 37
Practical Internal Assessment Marks: 13

Course Objectives:

1.	To acquire programming skills in core Python.
2.	To acquire Object Oriented Skills in Python.
3.	To define the structure and components of a Python program.
4.	To learn how to read and write files in Python.
5.	To develop the ability to write database applications in Python.

Lab – I: Based on Python, Programming Language

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Read, write, and execute simple Python programs.
CO-2.	Write simple Python programs for solving problems.
CO-3.	Decompose a Python program into functions, lists etc.
CO-4.	Read and write data from/to files in Python Programs.
CO-5.	Underline the use of package.

B.Sc. (Information Technology) Semester – III
BIT-235P
Programming Lab-II (Data Structures)

Credit Hours (Per Week):4 **Max. Marks: 25**
Total Hours: 60 **Practical Marks: 18**
Practical Internal Assessment Marks: 07

Course Objectives:

1.	The main objective of this practical lab is to make the students to be able to implement the programs utilizing different data structure techniques to organize and manage data in computer's memory.
2.	The students will gain an understanding of different approaches available for searching and sorting the data and further be able to identify the methods requiring minimum time to perform the pre-mentioned tasks.

Lab II: Data Structures

Course Outcomes:

After the completion of this course, students will be able

CO-1.	Implement the real world applications by making use of linear data structure, such as, arrays, stacks, queues, linked lists, trees and graphs, to handle the data stored in computer's memory.
CO-2.	Perform the implementation using non-linear data structure, such as, trees and graphs.
CO-3.	Perform traversing, insertion, and deletion operations on the above mentioned data structures.
CO-4.	Perform the search operations by making use of suitable search technique.
CO-5.	Sort the data by using different sorting techniques and assess the time requirement of the available sorting techniques.

B.Sc. (Information Technology)
Semester-IV

Sr. No.	Paper Code	Paper Name	Marks				Page No.
			Theory	Internal Assessment	Practical	Total	
1	BIT-241	Database Management System	56	19	-	75	238-239
2	BIT-242	Computer Architecture	56	19	-	75	240-241
3	BIT-243	Java Programming	56	19	-	75	242-243
4	ESL–222	Environment Studies – II (Compulsory)	37	13	-	50	244-246
5	BIT-244	Compiler Design	56	19	-	75	247-248
6	BIT-245P	Programming Lab – I (Oracle)	-	13	37	50	249
7	BIT-246P	Programming Lab – II (Java)	-	13	37	50	250

Note:

1. All the students are required to undergo 'Industrial Training' for 6 weeks in IT Companies after 4th semester final examinations. Final degree to the students will be awarded subject to their successfully completing the 'Industrial Training'.
2. 'Industrial Training' will be evaluated as satisfactory / unsatisfactory internally by the department.
3. Last date for submission of training Report within 1 Week after coming from training.
4. Marks of Paper EVS will not be included in Grand Total.

B.Sc. Information Technology) Semester – IV

BIT-241: Database Management System

Time: 3 Hours **Max. Marks: 75**
Credit Hours (per week):4 **Theory Marks: 56**
Total Hours:60 **Theory Internal Assessment Marks: 19**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **11 marks.** The total weightage of this section shall be **22 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **11 marks**. The total weightage of this section shall be **22 marks**.

Course Objectives:

1.	To provide a sound introduction to the discipline of database management as a subject in its own right, rather than as a compendium of techniques and product-specific tools.
2.	To familiarize the participant with the nuances of database environments towards an information-oriented data-processing oriented framework.

UNIT-I

Introduction to data, field, record, file, database, database management system. Structure of database system, Advantage and disadvantage, levels of database system, Relational model, hierarchical model, network model, comparison of these models, E–R diagram, different keys used in a relational system, SQL.DBA, responsibilities of DBA, Relational form like INF, 2NF, 3NF, BCNF, 4^{th} NF, 5^{th} NF, DBTG, concurrency control and its management, protection, security, recovery of database.

UNIT-II

SQL: Introduction to SQL–DDL, DML, DCL, Join methods & sub query, Union Intersection, Minus, Tree Walking, Built in Functions, Views, Security amongst users, Sequences, Indexing Cursors–Implicit & Explicit, Procedures, Functions & Packages Database Triggers.
Big Data: Introduction to Big Data and Analytics, Introduction to NoSQL
Introductory knowledge and classification of NoSQL databases based upon Column (HBase), Document (MongoDB), Keyvalue (Oracle NoSQL database), Graph, Multimodel and their query languages.

References:

1. Introduction to Database System By C.J. Date.
2. Database Management System By B.C. Desai.
3. Database Concept by Korth.
4. Simplified Approach to DBMS– Kalyani Publishers
5. Oracle – Developer – 2000 by Ivan Bayross.
6. Database System concepts & Oracle (SQL/PLSQ) – AP Publishers.
7. https://www.mongodb.com/nosql-explained
8. Introduction to NoSQL (Ebook), NoSQL Seminar 2012 @ TUT, Arto Salminen

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Describe the fundamental elements of relational database management systems.
CO-2.	Explain the basic concepts of relational data model, entity-relationship model, relational database design, relational algebra and SQL.
CO-3.	Design ER-models to represent simple database application scenarios.
CO-4.	Convert the ER-model to relational tables, populate relational database and formulate SQL queries on data.
CO-5.	Gain knowledge to improve the database design by normalization.

B.Sc. (Information Technology) Semester – IV

BIT-242: Computer Architecture

Time: 3 Hours **Max. Marks: 75**
Credit Hours (per week):4 **Theory Marks: 56**
Total Hours:60 **Theory Internal Assessment Marks: 19**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **11 marks**. The total weightage of this section shall be **22 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **11 marks**. The total weightage of this section shall be **22 marks**.

Course Objectives:
Students will try to learn:

1.	Conceptualize the basics of organizational and architectural issues of a digital computer.
2.	Analyze processor performance improvement using instruction level parallelism.
3.	Study various data transfer techniques in digital computer.
4.	Articulate design issues in the development of processor or other components that satisfy design requirements and objectives.

UNIT-I

Information Representation: Register Transfer, Various Registers, Implementing Common Bus Using Multiplexers: Logical; Arithmetic & Shift Micro – operations.
Basic Computer Design Instruction Codes, Interfacing various Registers, Computer Instructions, Timing Signals, Instruction Cycle, Design of a Basic Computer.
CPU Design Stack Organized CPU, Instruction Formats, Addressing Modes.

UNIT-II

CPU Design Program Control, Hardwired & Micro-programmed (Wilhe's Design) Control Unit.

Memory Organization Memory Hierarchy, Designs & Concepts of Main Memory, Auxiliary Memory, Associative Memory, Cache and Virtual Memory.

I/O Organization I/O Interface, Modes of Transfer, Program Interrupt, DMA & I/O Processor.

Pipeline & Vector Processing Parallel Processing Pipelining, Parallel & Distributed Computers, SISD, SIMD & MISD, MIMD Machines, Vector Processing.

References:

1.Computer System Architecture: M.M. Mano (PHI).
2.Computer Architecture: J.P. Hayes.
3.Computer Architecture: Patterson & Hemessy.
4.Computer Organization and Architecture by William Stallings.
5. Computer Systems Design and Architecture "by Vincent P Heuring and Harry F Jordan.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Describe basic organization of computer.
CO-2.	Demonstrate control unit operations and conceptualize instruction level parallelism.
CO-3.	Demonstrate and perform computer arithmetic operations.
CO-4.	Categorize memory organization and explain the function of each element of a memory hierarchy.
CO-5.	Identify and compare different methods for computer I/O mechanisms.

B.Sc. (Information Technology) Semester – IV

BIT-243: JAVA PROGRAMMING

Time: 3 Hours **Max. Marks: 75**
Credit Hours (per week):4 **Theory Marks: 56**
Total Hours:60 **Theory Internal Assessment Marks: 19**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **11 marks.** The total weightage of this section shall be **22 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will **carry 11 marks**. The total weightage of this section shall be **22 marks**.

Course Objectives:
Student should be able

1.	To understand object-oriented programming concepts and apply them in solving problems.
2.	To introduce the principals of inheritance and polymorphism and demonstrate how they relate to design of abstract class.
3.	To introduce the implementation of packages and interfaces.
4.	To introduce the concept of exception handling and multithreading.

UNIT-I

Introduction to Concepts of Programming: . Introduction to Java, JVM, Features of java, JDK Environment & tools like(java, javac, applet viewer, javadoc, jdb)
Introduction to Java: Structure of java program, Data types, Variables, Operators, Keywords, Naming Convention, Decision Making (if, switch), Looping(for, while) , Type Casting
Classes and Objects: Creating Classes and objects, Memory allocation for objects, Constructor, Implementation of Inheritance (Simple, Multilevel, Hierarchical), Implementation of Polymorphism (Method Overloading , Method Overriding), Nested and Inner classes
Arrays String and Vector : Arrays, Creating an array, Types of Array (One Dimensional arrays, Two Dimensional array),Strings, String – Arrays, String Methods, String Buffer class, Vectors , Wrapper classes
Abstract Class : Interface and Packages , Modifiers and Access Control (Default, public private protected), Abstract classes and methods

UNIT-II

Interfaces and Packages : (Packages Concept , Creating user defined packages , Java Built in packages , Java.lang->math , Java.util->Random, Date, Hash Table)

Multithreading: Creating Threads using Different methods, Thread Priorities, Thread Synchronization, Inter process thread Communication.

Exception Handling : Exception types , Using try catch and Multiple catch , Nested try , throw , throws and finally , Creating User defined Exceptions

File Handling : Byte Stream , character stream , file IO Basics ,File Operations(Creating file, Reading file(Character, byte), Writing File (Character, byte)).

References:

1. "Java–The Complete Reference", Herbert Schildt, Tata MacGraw Hill.
2. "Introduction to Java Programming", Y. Daniel Mliang, Pearsons Publications.
3. Programming with JAVA - E Balgurusamy
4. JAVA:How to Programm- Paul Deital and Harvey Deital.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Understand the concept of OOPs as well as the purpose and uses principal of inheritance, polymorphism in encapsulation and method overloading.
CO-2.	Identify classes, objects, members of a class and the relationship among them which is needed for a specific problem.
CO-3.	Create a java applications and programs using sound oops practices
CO-4.	Develop programs using the java collection API as well as the java standard class library.
CO-5.	Develop and understand exception handling.

B.Sc. (Information Technology) Semester – IV

Course Code: ESL–222
Course Title: ENVIRONMENTAL STUDIES–II (COMPULSORY)

Credit Hours (Per Week): 2
Total Hours: 30
Maximum Marks: 50 Marks

Instructions for Paper Setters: The question paper will consist of three sections. Candidate will be required to attempt all the sections. Each unit of the syllabus should be given equal weightage of marks. Paper to be set in English, Punjabi and Hindi.
Section–A: (16 Marks): It will consist of five short answer type questions. Candidates will be required to attempt four questions, each question carrying four marks. Answer to any of the questions should not exceed two pages.
Section–B: (24 Marks): It will consist of five questions. Candidates will be required to attempt four questions, each question carrying six marks. Answer to any of the questions should not exceed four pages.
Section–C: (10 Marks): It will consist of two questions. Candidate will be required to attempt one question (carrying ten marks) only. Answer to the question should not exceed 5 pages.

Course Objectives

CO-1	To study the concept of Biodiversity – role, importance, values and its conservation. Hot spots and threats to biodiversity.
CO-2	To create awareness regarding environmental pollution, its causes and effects and preventive measure to control the different types of pollution.
CO-3	To make students aware of growing human population – causes and concern. Family welfare programs. Road safety (Traffic) rules.
CO-4	To know about entrepreneurship development and civil/self defense.

UNIT-I

Biodiversity and its Conservation:

- Definition: Genetic, species and ecosystem diversity.
- Biogeographical classification of India.
- Value of Biodiversity: Consumptive use; productive use, social, ethical, aesthetic and option values.
- Biodiversity of global, National and local levels.
- India as mega-diversity nation.
- Hot-spots of biodiversity.

- Threats to Biodiversity: Habitat loss, poaching of wild life, man wildlife conflicts.
- Endangered and endemic species of India.
- Conservation of Biodiversity: In situ and Ex-situ conservation of biodiversity.

UNIT-II

Environmental Pollution:

- Definition, causes, effects and control measures of:
  a) Air Pollution
  b) Water Pollution
  c) Soil Pollution
  d) Marine Pollution
  e) Noise Pollution
  f) Thermal Pollution
  g) Nuclear Hazards
  h) Electronic Waste
- Solid Waste Management: Causes, effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution.
- Pollution case studies.
- Disaster Management: Floods, Earthquake, Cyclone and Landslides.

UNIT-III

Human Population and the Environment

- Population growth, variation among nations.
- Population explosion-Family welfare programme.
- Environment and human health.
- Human rights.
- Value education.
- HIV/AIDS.
- Women and child welfare.
- Role of information technology in environment and human health.
- Case studies.
- Road Safety Rules & Regulations**:** Use of Safety Devices while Driving, Do's and Don'ts while Driving, Role of Citizens or Public Participation, Responsibilities of Public under Motor Vehicle Act, 1988, General Traffic Signs.
- Accident & First Aid**:** First Aid to Road Accident Victims, Calling Patrolling Police & Ambulance.

UNIT-IV

National Service Scheme:

- **Entrepreneurship Development:** Definition & Meaning; Qualities of good entrepreneur; Steps/ ways in opening an enterprise; Role of financial and support service Institutions.

- **Civil/Self Defense:** Civil defense services, aims and objectives of civil defense; Needs for self-defense training.

Field Visits:

- Visit to a local area to document environmental assets–river/forest/grassland/hill/ mountain.
- Visit to a local polluted site–Urban/Rural/Industrial/Agricultural.
- Study of common plants, insects, birds.
- Study of simple ecosystems–pond, river, hill slopes etc.
- Contribution of the student to NSS/any other social cause for service of society.
- Visit to Museum/Science City

Note: In this section the students will be required to visit and write on the environment of an area/ ecosystem/vi1lage industry/disaster/mine/dam/agriculture field/waste management/hospital etc. with its salient features, limitations, their implications and suggestion for improvement.

References/Books:

11. Agarwal, K. C. 2001. Environmental Biology, Nidhi Publications Ltd. Bikaner.
12. Bharucha, E. 2005. Textbook of Environmental Studies, Universities Press, Hyderabad.
13. Down to Earth, Centre for Science and Environment, New Delhi.
14. Jadhav, H. & Bhosale, V. M. 1995. Environmental Protection and Laws. Himalaya Pub.
15. Joseph, K. and Nagendran, R. 2004. Essentials of Environmental Studies, Pearson Education (Singapore) Pte. Ltd., Delhi.
16. Kaushik, A. & Kaushik, C. P. 2004. Perspective in Environmental Studies, New Age International (P) Ltd, New Delhi.
17. Miller, T. G. Jr. 2000. Environmental Science, Wadsworth Publishing Co.
18. Sharma, P. D. 2005. Ecology and Environment, Rastogi Publications, Meerut.
19. Booklet on Safe Driving. Sukhmani Society (Suvidha Centre), District Court Complex, Amritsar
20. Kanta, S., 2012. Essentials of Environmental Studies, ABS Publications, Jalandhar.

Course Outcomes

On Completing the course, the students will be able to:

CO-1	To know about the meaning of Biodiversity and its role in environment.
CO-2	To know about the causes of different forms of pollution and their control measures.
CO-3	To know about the causes and challenges of growing human population. Women and child welfare programs.
CO-4	To know the development of entrepreneurship and techniques of civil/self defense.

B.Sc. (Information Technology) Semester – IV
BIT-244: Compiler Design

Time: 3 Hours **Max. Marks: 75**
Credit Hours (Per Week): **Theory Marks: 56**
Theory Internal Assessment Marks: 19

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **11 marks**. The total weightage of this section shall be **22 marks.**

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **11 marks.** The total weightage of this section shall be **22 marks**.

Course Objectives:

1.	To learn the process of translating a high-level language program to executable code.
2.	To understand the fundamental principles in compiler design and to identify the relationships among different phases of compiler.

UNIT-I

Basics of Compilers and different phases of compiler design
Detailed study of Lexical Analysis and Syntax Analysis
Storage Management
Static Storage Management, Dynamic Storage Management.
Symbol Table Handling
Symbol table contents, operations on Symbol Tables, Organizations of Symbol Tables.
Intermediate Code Generation: Three address Code (Triples, Quadruples).

UNIT-II

Code Generation
Code Generator, Code generation of simple programming constructs.
Code Optimization
Local optimization, global optimization, loop optimization
Types of Compiler-Incremental compilers and Cross Compilers.

References:

1. Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman: *Compiler, Principles, Techniques and Tools*, Addision Wesley, 2006.
2. Tremblay J.P., Sorenson P.G., *The Theory and Practice of Compiler Writing*,

Mc–Graw Hill, 2007.
3. Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman: *Principles of Compiler Design*, Narosa Publishing House, 2007.
4.S.Malathi, K.Kiruthika, C. Jackulin, Compiler Design, Ane Books Pvt. Ltd.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Study the lexical, syntactic and semantic structures of high-level language codes.
CO-2.	Learn about compiler generation tools and techniques.
CO-3.	Understand the applications of Regular Expressions, finite state machines and context free grammars in design of compilers.
CO-4.	Know about the importance of code optimization.
CO-5.	Understand memory management both in the compiler and in the generated code.

B.Sc. (Information Technology) Semester – IV
BIT-245P
Programming Lab-I(Oracle)

Credit Hours (per week):

Total Marks: 50
Practical Marks: 37
Practical Internal Assessment M:13

Course Objectives:

1.	To get acquaint students with the basics of DBMS, different Architectural Models for DBMS, Normalization of data, Concurrency control problems and its management, Protection, Security and recovery aspects of databases along with practical knowledges of databases using SQL and PL/SQL.
2.	The key goal is to prepare students for a professional career in the field of data administration and database design.
3.	To get acquaint students with basics of database security and administration.
4.	To get acquaint students with good knowledge of DBMS. During the course, students will learn about database design and database handling activities.

Lab – I: Oracle

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Gain knowledge on Databases and their design & development.
CO-2.	Develop intellectual Cognitive/ analytical skills: Normalization of Databases.
CO-3.	Develop practical Skills , using SQL and PL/SQL.
CO-4.	Develop transferable skills: Usage of DBMS design and administration.

B.Sc. (Information Technology) Semester – IV
BIT-246P
Programming Lab-II (JAVA)

Credit Hours (per week):4

Total Marks: 50
Practical Marks: 37
Practical Internal Assessment M: 13

Course Objectives:

1.	Java is the most prevalent programming language in the software industries for implementing the software systems.
2.	The main focus of this practical lab is to make the students proficient in developing the software systems by using Java programming language by teaching them the basic concepts and notions of JAVA.

Lab – II: Java

Course Outcomes:

After completion of this course, the students will be able to

CO-1.	Apply the basic constructs for developing java programs.
CO-2.	Construct the applications incorporating inheritance and polymorphism features.
CO-3.	Implement inter-process communication by utilizing the concept of threads.
CO-4.	Develop applications capable of handling exceptions.
CO-5.	Implement the concept of file handling.

B.Sc. (Information Technology)
Semester-V

Sr. No.	Paper Code	Paper Name	Marks				Page No.
			Theory	Practical	Internal Assessment	Total Marks	
1	BIT-351	Computer Networks	75	-	25	100	252-253
2	BIT-352	Operating System	75	-	25	100	254-255
3	BIT-353	Web Development using PHP	56	-	19	75	256-257
4	BIT-354P	Lab – I Computer Networks and Operating System	-	56	19	75	258
5	BIT-355P	Lab – II PHP	-	37	13	50	259

B.Sc. (Information Technology) Semester – V
BIT-351: Computer Networks

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (per week):4 **Theory Marks: 75**
Total Hours:60 **Theory Internal Assessment M: 25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.
Course Objective:

1.	Describe how computer networks are organized with the concept of layered approach.
2.	Implement a simple LAN with hubs, bridges and switches.
3.	Describe how packets in the Internet are delivered.

UNIT – I

Basic concepts of Computer
Networks, Client Server Network topologies. OSI Reference Model, TCP/IP Model Comparison and Critiques, Concepts of Routers, bridges, Repeaters, Gateways.
Data Transmission: – Analog & Digital Transmission, Modem, Codec, Pulse Code Modulation Multiplexing, Circuit Switching, Packet Switching, message Switching, Hybrid Switching.

UNIT – II

Transmission Media: – Twisted Pair, Co–axial Cable, Baseband, Broadband, Fibre optics, Satellite, Wireless Transmission, Telephone System
The Data link Layer: Design Issues, Error Detection and Correction, Data Link Sliding Window Protocols.
IEEE Standard 802 for LAN's and MAN's Routing Algorithm.
Internetworking, Network Security.

References:

1. Tanenbaum A.S. 'Computer Network', PHI.
2. Stalings W., 'Data and Computer Communications', PHI.
3. Data Communication and Networking by Behrouz A Forouzan.
4. Stallings W. , Local Network: An Introduction Macmillan Publishing Co.

Course Outcome:

On completion of this course students will able to:

CO-1.	Understand the concepts of data communication and networks, TCP/IP and OSI reference models.
CO-2.	Discuss the process of Multiplexing, switching and transmission media in networks.
CO-3.	Understand the services of data link layer and protocols.
CO-4.	Understand multiple access protocols and Ethernet
CO-5.	Know about the services of network layer, transport layer and application layer.

B.Sc. (Information Technology) Semester – V

BIT-352: Operating System

Time: 3 Hrs. **Total Marks: 100**

Credit Hours (per week):4 **Theory Marks: 75**

Theory Internal Assessment M: 25

Note: 1. Medium of Examination is English Language.

2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

Course Objectives:

1.	To understand what a process is and how processes are synchronized and scheduled.
2.	To understand the services provided by and the design of an operating system.
3.	To understand the structure and organization of the file system.
4.	To understand different approaches to memory management.
5.	Students should be able to use system calls for managing processes, memory and the file system.

UNIT – I

Introduction:

Definition, evolution, need, early system, function, buffering spooling, single user, multiuser, multiprogramming, multiprocessing, multitasking, multithreading, batch processing, real time, time systems, time sharing systems, security, protection.

Processor Management / CPU Scheduling:

CPU – I/O Basic Cycle, process state, process control block, Scheduling, Queue, Schedulers, Scheduling Algorithms, Performance criteria, FCFS, SJF, Priority, SRTF, Round Robin, Multi – Levels users Algorithm.

Deadlocks:

Definition, Necessary condition for deadlock, Deadlock Prevention Mutual exclusion, Hold and wait, No pre–emption, circular wait Banker's algorithms, Recovery from deadlock, semaphores.

UNIT – II

Memory Management:

Concept of Relocation, Swapping, backing storage, swap time, MFT, MFT job scheduling, region size selection, memory fragmentation, MVT, MVT job scheduling compaction, paging, segmentation.

Virtual Memory: Overlays, demand paging, page fault, performance of demand paging, page replacement, page replacement algorithm, FIFO, Optimal page replacement, Thrashing.

Device Management: I/O and device management physical characteristics, FCFS, SSTF, SCAN,

CSCAN.

File Management: Disk and File Management.

References:

1. "Operating System Concepts", Fourth Edition by Silberschatz Galvin Addison Wesley.
2. "Operating Systems: A Design Oriented Approach" by Crowley, Published by Tata McGraw Hill.
3. "Operating Systems" Second Edition by Dietel, Addison Wesley.
4. Madnick & Donovan: Operating System, McGraw Hill
5. A.C. Shaw:Logic Design of Operating Sytem, Prentice Hall.

Course Outcomes:

On completion of this course students will able :

CO-1.	Understand the working of an OS as a resource manager, file system manager, process manager, memory manager and I/O manager and methods used to implement the different parts of OS.
CO-2.	Understand the main components of an OS & their functions.
CO-3.	Describe the important computer system resources and the role of operating system in their management policies and algorithms.
CO-4.	Evaluate the requirement for process synchronization and coordination handled by operating system.
CO-5.	Implement advance features of object-oriented approach in other various language(s).
CO-6.	Describe and analyze the memory management and its allocation policies.
CO-7.	Identify use and evaluate the storage management policies with respect to different storage management technologies.
CO-8.	Identify the need to create the special purpose operating system
CO-9.	Understand the concepts and implementation ,memory management policies and virtual Memory.
CO-10.	Understand various issues in Inter Process Communication (IPC) and the role of OS in IPC.
CO-11.	Understand the process management policies and scheduling of processes by CPU.

B.Sc. (Information Technology) Semester – V
BIT-353: Web Development using PHP

Time: 3 Hours **Max. Marks: 75**
Credit Hours (Per Week): **Theory Marks: 56**
Theory Internal Assessment Marks: 19

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **11 marks**. The total weightage of this section shall be **22 marks.**

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **11 marks**. The total weightage of this section shall be **22 marks**.

Course Objectives:

1.	The major objective of this course is to provide conceptual and practical exposure to field of web development and designing using php and MySQL.
2.	Students can enhance and upgrade their skills of programming though learning PHP practically. Students will implement the theoretical concepts of database learnt in lower classes using MySQL database.
3.	The course provides complete understanding about difference between Client and Server architectures used in websites.
4.	Many leading websites and projects are based on PHP and MySQL. So, it provides opportunity for the students to get placed in IT companies.

UNIT-I

Introduction to PHP: Introduction to PHP, History & Future Scope of PHP, Benefit & Importance of PHP , Installation of tools for working in PHP like XAMPP, WAMP for PHP, Apache & MySQL.

Introduction to Language constructs: Variables, constants, PHP's inbuilt data types
Keywords, Comments, Operators & Expressions: Arithmetic, Assignment, Comparison, Logical Operators, String & echo, print for outputting in web page: string functions, Using Loop Statement like for, for each, do while, while, switch, goto, and continue.

Working with flow control through Control Statement: if-else, if-else ladder

Arrays: Introduction to Array, Simple array declaration, use of array, Numeric Array, Associative Array, Multidimensional Array, Array Functions, explode & implode functions

PHP Functions: Defining User functions, Passing parameter & return value, Use of Math functions, String functions, Date & time function, Date formats, Include,

Require.FORM:GET/POST/REQUEST, Using html controls in web page, Master/Child Page concept.
State Management: Using Session in web pages for user authentication, Using Cookies in web pages for user authentication.

UNIT-II

Object Oriented Programming::Classes, Object & Constructor & Destructor, Using Access Specifier, Inheritance, Overloading.
Java Script: Syntax, Comments, Variables, Operators, Data Types, Function, Object, Condition, Looping, Form Validation.
Jquery: Syntax , selectors ,Events, effects , Jquery CSS Classes.
Ajax: Ajax introduction, XML Http, Request, Response, Event, PHP.

Introduction to MySQL: Logging on to MySql, Creating a Database, Creating a Table, Inserting Data into a table, Viewing stored Data, Modifing Stored data, Deleting Stored Data**.**

Connecting to MySQL with PHP: Sending SQL Queries with PHP.
Submitting & showing data to/from web controls from/to database, Uploading files to server/ upload form /upload script, Sending emails/ email script

References:

1. PHP and MYSQL web development (4th Edition).
2. PHP for Beginners by Ivan Bross.
2. PHP: The Complete Reference by Steven Holzner
3. PHP Pocket Reference by PHP Pocket Reference.
4. PHP and MySQL Web Development by Laura Thomson and Luke Welling
5. Head First Php & MySQL By by Beighley

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Design and develop websites in PHP.
CO-2.	Understand about database connectivity used for fetching data from servers.
CO-3.	Get placements in IT companies as a Website designer/developer.
CO-4.	Get placed in IT companies as many leading websites and projects are based on PHP and MySQL.
CO-5.	Become freelancer website designers/developers .

B.Sc. (Information Technology) Semester – V
BIT-354P
Lab I (Computer Networks and Operating System)

Credit Hours (per week):4 **Total Marks: 75**
Total Hours:60 **Practical Marks: 56**
Practical Internal Assessment M: 19

Course Objectives:

1.	To introduce students with basic concepts of Operating System, its functions and services.
2.	To familiarize the students with various views and management policies adopted by O.S. as pertaining with processes, Deadlock, memory, File and I/O operations.
3.	To brief the students about functionality of various OS like Unix, Linux and Windows XP as pertaining to resource management.
4.	Students will learn about various services provided by network.
5.	Describe how computer networks are organized with the concept of layered approach.
6.	Implement a simple LAN with hubs, bridges and switches.

Practical Lab: Computer Networks and Operating System
Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Understand the working of an OS as a resource manager, file system manager, process manager, memory manager and I/O manager and methods used to implement the different parts of OS.
CO-2.	Understand the main components of an OS & their functions.
CO-3.	Describe the important computer system resources and the role of operating system in their management policies and algorithms.
CO-4.	Evaluate the requirement for process synchronization and coordination handled by operating system.
CO-5.	Implement advance features of operating system in other various language(s).
CO-6.	Uderstand the working of an OS as a resource manager, file system manager, process manager, memory manager and I/O manager and methods used to implement the different parts of OS.

B.Sc. (Information Technology) Semester – V
BIT-355P
Lab II (PHP)

Credit hours (per week):4

Total Marks: 50
Practical Marks: 37
Practical Internal Assessment M: 13

Course Objectives:

1.	The main objective of this course is to impart practical implementation of all the theoretical concepts studied in PHP programming language.
2.	Students will sharpen their website development skills by implementing client-server model using My SQL database connectivity.

Practical Lab: PHP

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Design and develop websites in PHP.
CO-2.	Gain ability to implement client-server model.
CO-3.	Understand about basics of database, SQL operations and connectivity of PHP with MYSQL used for fetching data from servers in practical way.
CO-4.	Get hands on training in website designing and logic development using PHP and MySQL which help them to get placement in IT companies.
CO-5.	Work as freelancer website designers/developers

B.Sc. (Information Technology)
Semester-VI

Sr. No.	Paper No.	Paper	Marks				Page No.
			Theory	Practical	Internal Assessment	Total	
1	BIT-361	Computer Graphics	56	-	19	75	261-262
2	BIT-362	Internet Applications and E-Business	75		25	100	263-264
3	BIT-363P	Lab (Applications of Computer Graphics in C/C++ and HTML)	-	18	07	25	265
3	BIT-364P	Project	-	150	50	200	266

B.Sc. (Information Technology) Semester – VI
BIT-361: Computer Graphics

Time: 3 Hours **Max. Marks: 75**
Credit Hours (per week):4 Total Hours:60 **Theory Marks: 56**
Theory Internal Assessment Marks: 19

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **11 marks**. The total weightage of this section shall be **22 marks.**

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **11 marks**. The total weightage of this section shall be **22 marks**.

Course Objectives:

1.	Introduction to the basic concepts of computer graphics.
2.	Develop programming skills in computer graphics
3.	Develop skills of creating 2D and 3D objects.

UNIT-I

Preliminaries

Basics of Computer Graphics, Computer graphics Hardware and Software.

2D Primitives

Line drawing, circle drawing and simple line clipping algorithms.

2D-Transformations

Simple 2D- Transformations and their different representations, composite 2D-Transformations

UNIT-II

3D-Transformations

Simple 3D-Transformations, composite 3D-Transformations.

Hidden Surfaces

Depth comparisons, Z-buffer algorithm, Scan line algorithms.

Projections

Parallel Projections, Perspective Projections, Oblique Projections.

References:

1. Donald Hearn & M. Pauline Baker, 'Computer Graphics', Printice Hall of India Private Limited, 2008.
2. Foley, A. Van Dam. S. Feiner, and J. Hughes, 'Computer Graphics: Principles and Practice', Addison-Wesley, 2006.
3. David F. Rogers, 'Procedural Elements for Computer Graphics', McGraw Hill Book Company, 2006.
4. Roy A. Plastick & Cordon Kalley, 'Computer Graphics', McGraw Hill Book Company, 2007.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Understand the different areas and applications of Computer Graphics.
CO-2.	Get knowledge on the fundamental computer graphics algorithm.
CO-3.	Get knowledge on designing and developing 2D and 3D objects using programs.
CO-4.	Understand the different geometric transformations on graphic objects and apply them in composite form.
CO-5.	Learn different projections and visible surface detection techniques.
CO-6.	Use of Line Clipping algorithms to extract lines.

B.Sc. (Information Technology) Semester – VI

BIT-362: Internet Applications and E- Business

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (per week):4 **Theory Marks: 75**
Total Hours:60 **Theory Internal Assessment M: 25**

Note: The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

Course Objectives:

1.	The primary goal is to prepare students for full knowledge of internet its application and working of Internet and practical use of internet for online transactions like use of e-banking.
2.	To get good knowledge of internet protocol, working of all protocols
3.	Also you can learn how to design web pages in HTML and DHTML practically.
4.	To get good knowledge of various modes of online payment.
5.	Also you can learn various security mechanisms.

UNIT-I

Introduction: About internet and its working, business use of internet, services offered by internet, evolution of internet, Internet Service Provider (ISP), internet addressing (DNS) and IP addresses. E–Mail Basic Introduction, advantage and disadvantage, structure of an email message, working of e–mail (sending and receiving messages), managing email (creating new folder, deleting messages, forwarding messages, filtering messages, implementation of outlook express.Internet protocol Introduction, File transfer protocol (FTP), Gopher, Telnet, other protocols like HTTP and TCP/IP. WWW introduction, working of WWW, Web browsing (opening, viewing, saving and printing a web page and bookmark), web designing using HTML, DHTML with programming techniques.

E – Commerce: Its definition, aims, process tools and results, EDI, VAN's and internet as Promoters, Types of E – Commerce, Commerce – net.

UNIT-II

Steps to Start E – Commerce: H/W & S/W Requirements, steps involved in opening your own online business.

EDI: EDI Vs Traditional Systems, EDI enabled procurement process, components of EDI system, EDI implementation issues.

Concerns for E – Commerce: Basic challenges to E – Commerce, Technological, legal and

regulators heads, Internet Bandwidth & Technological Issues.

NII: Technical issues, standards & Services GII, Issues that confront us in relation to securing electronic transactions. Implementation of digital signatures. Authentication Mechanisms. Electronic cash, its elements, legal issues, risks, paper document versus Electronic document Laws for E – Commerce legal issues for Internet Commerce.

References:

1. "Understanding The Internet", Kieth Sutherland, Butterworth-Heinemann; 1st Edition (October 31, 2000).
2. "Internet Technologies", S. K. Bansal, APH Publishing Corporation (April 1, 2002).
3. "Data Communications and Networking", Behrouz A. Forouzan, 3rd Edition.
4. E – Commerce –The Cutting Edge of Business. By: Kamlesh K. Bajaj. Debjani Nag.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Describe how to define internet, www and various protocols
CO-2.	Demonstrate an understanding of working of internet.
CO-3.	Create email id and use it for sending online mails and attachments.
CO-4.	Judge which connection should they use for getting an internet at home or work.
CO-5.	Analyze the impact of E-commerce on business models and strategy.
CO-6.	Understand the foundation and importance of E-commerce.
CO-7.	Describe how to define internet, www and various protocols
CO-8.	Demonstrate an understanding of working of internet.

B.Sc. (Information Technology)
Semester – VI

BIT-363P: Lab (Applications of Computer Graphics in C/C++ and HTML)

Credit Hours (per week): 4
Total Hours:60 **Total Marks: 25**
Practical Marks: 18
Practical Internal Assessment: 07

Course Objectives:

1.	Make the students understand the concept of graphics.
2.	Acquaintance with mathematics behind graphical transformation.
3.	Design, develop and implement two and three dimensional graphical structures.

Practical Lab: Applications of Computer Graphics in C++/C and HTML

Course Outcomes:

At the end of this course student will be able to:

CO-1.	Learn the concept of raster and random scans.
CO-2.	Implement the algorithms for 2D primitives: Line and Circle drawing.
CO-3.	Implement different line clipping algorithms.
CO-4.	Apply various 2D and 3D transformation techniques (Translation, Rotation, Scaling, Reflection and Shearing).
CO-5.	Study the Implementation of different types of Projections (Parallel and Perspective).

B.Sc. (Information Technology) Semester – VI

BIT-364P: PROJECT

Credit Hours (per week):4
Total Hours:60 **Max. Marks: 200**
Project Marks: 150
Internal Assessment: 50

Course Objectives:

1.	The main objective of this course is to develop a software module based on the programming and database concepts learnt throughout the programme.
2.	Students will use programming and database management skills to develop a solution of a real-life problem using any programming language and database platform.

General Instructions:

1. A software module based on the work done in the entire course is to be developed.
2. The soft copy of the module shall be submitted to the College/Institute till April 30.
3. The software module shall be developed in groups, consisting of at most two students in a group.
4. The college shall depute guide(s)/supervisor(s) under whose supervision the software module shall be developed. The guide/supervisor shall clarify that the work done is original & authenticated. The certificate found to be incorrect at any stage shall attract the proceedings against all the stakeholders, as per the University rules.
5. The evaluation of the module shall be done as per the common ordinance of UG/PG w.e.f. 2012-2013 under semester system.
6. Training certificate of industrial training should be submitted to the College and also attached in the project.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Design and develop a software module or website.
CO-2.	Opt for software/website development field to build their career.
CO-3.	Work as freelancer to build solutions of various programming and/or website development related problems.
CO-4.	Deploy the database enabled dynamic websites/projects on servers in practical point of view.
CO-5.	Get excellent placements in various multinational companies.

SYLLABUS FOR THE BATCH FROM THE YEAR 2023 TO YEAR 2026

Programme Code: BCS

Programme Name: B.Sc. (Computer Science))

(Semester I-VI)

Examinations: 2022-2025

P.G. Department of Computer Science & Applications

Khalsa College, Amritsar

Programme name: B.Sc. (Computer Science)
Programme code: BCS
Programme Duration :3 years

Programme Objectives:

1.	To impart sound knowledge in Computer Science and to enable students to apply the acquired skills creatively in computer and related technologies in practical scenarios.
2.	To effectively utilize knowledge of computing and mathematical principles to develop sustainable solutions to the present and the prospective computing problems.
3.	To effectively initiate, create and to communicate innovation through social, legal, ethical, and cultural issues inherent in the discipline of computing concepts and solutions to bridge the gap between computing industry experts and business leaders.
4.	To exhibit computing expertise through corporate leadership and entrepreneurship;
5.	To address in the broad areas of multi-disciplinary in nature, and to keep pace with advances in computing technology;

Program Specific Outcomes (PSOs):

PSO-1.	Understand the fundamental concepts in physics, Computer Science & mathematics and develop ideas based on them.
PSO-2.	Possess knowledge on topics in pure physics, computer science & mathematics, empowering her/him to pursue higher degrees at reputed academic institutions.
PSO-3.	Demonstrate problem-solving skills, innovative thinking & creativity.
PSO-4.	Be motivated towards research in physics, computer science & mathematics and related fields.
PSO-5.	Students become eligible to serve in DRDO, defence, public sector and private Sector.

B.Sc. (Computer Science)

Semester – I

Sr. No.	Course Code	Course Name		Marks				Page No.
				Theory	Practical	Internal Assessment	Total	
1	BENC-1105	ENGLISH (COMPULSORY)		37	-	13	50	270-271
2	BPBI-1101/BPBI-1102/BPHC-1104	Punjabi/Basic Punjabi (Mudhli Punjabi) (Compulsory)/ Punjab History & Culture		37		13	50	272-275
3	CSC-111	COMPUTER SCIENCE (COMPUTER FUNDAMENTAL & INFORMATION TECHNOLOGY)		56	19	19Theory 06 Practical	100	276-278
4	PHY 111A	Physics	MECHANICS	25	-	25	100	279-284
	PHY 111B		ELECTRICITY AND MAGNETISM	25	-			
	PHY 111P		Practical		25			
5	MAT111A	Mathematics	Algebra	38	-	12	50	285-288
	MAT111B		Calculus and Trigonometry	37		13	50	
6	ZDA111	DRUG ABUSE						289-291

B.Sc. (Computer Science)
SEMESTER – I
BENC-1105: ENGLISH (COMPULSORY)

Time: 3 Hours **Max. Marks: 50**
Credit Hours (per week): 4 **Theory: 37**
Total Hours:60 **Internal Assessment: 13**

Instructions for the Paper Setter and Distribution of Marks:

The question paper will consist of three sections and distribution of marks will be as under:

Section A: 10 Marks
Section B: 17 Marks
Section C: 10 Marks

Section–A: Twelve (12) Questions on the usage of grammar related to the prescribed units of *Murphy's English Grammar* will be set for the students to attempt **any Ten (10)** (1X10= 10 Marks) **Section–B: EIGHT (8)** questions (four from each literary text) on theme, characterization, tone and style etc. will be set. The students will be required to attempt **any Four (4)** questions, choosing at least TWO from each prescribed text. The answer to each question should not exceed 15-20 sentences. (4X3=12 Marks)

1. The students will be required to write an **APPLICATION** to the head of an educational institution on any **ONE** out of the **TWO** Topics (1X5=5 Marks)
   Section–C : TWO questions, one from each literary text, will be set for the students to answer any **ONE.** (1X5 = 5 Marks)

1. A question requiring the students to write **a Paragraph** on **ONE** of the **TWO** given topics. (1X5 = 5 marks)

Course Objectives:

1.	To enhance language proficiency by providing adequate exposure to reading and writing skills.
2.	The prescribed course equips students with nuances of language that includes proficiency in grammar, its effective usage in speaking and writing.
3.	It further helps them to understand various features of short story and prose writing.

References:

1. *Tales of Life* (Guru Nanak Dev University, Amritsar)
2. *Prose for Young Learners* (Guru Nanak Dev University, Amritsar)
3. *Murphy's English Grammar 4th Edition(by Raymond Murphy) CUP*

Course Contents:

1) Stories at Sr. No. 1,2,3,5,6 from *Tales of Life*.
2) Essays at Sr. No. 1,2,3,5,6 from *Prose for Young Learners.*
3) Unit 1-18 from *Murphy's English Grammar.*

Course Outcome:

CO-1.	Appreciate the writings of various Indian and foreign story and prose writers and relate them to their sociocultural milieu.
CO-2.	Comprehend the meaning of texts and answer questions related to situations, episodes, themes and characters depicted in them.
CO-3.	Understand fundamental grammatical rules governing tenses and make correct usage in their language.
CO-4.	Independently write paragraphs on any given topic.

B.Sc. (Computer Science)
SEMESTER-I
BPBI - 1101
ਲਾਜ਼ਮੀ ਪੰਜਾਬੀ

ਸਮਾਂ : 3 ਘੰਟੇ ਕ੍ਰੈਡਿਟ ਪ੍ਰਤੀ ਹਫਤਾ : 04
ਕੁੱਲ ਘੰਟੇ : 60 ਥਿਊਰੀ ਅੰਕ : 37, ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ : 13, ਕੁੱਲ ਅੰਕ : 50

ਅੰਕ-ਵੰਡ ਅਤੇ ਪ੍ਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

- ਸਿਲੇਬਸ ਦੇ ਚਾਰ ਭਾਗ ਹਨ ਪਰ ਪ੍ਰਸ਼ਨ-ਪੱਤਰ ਦੇ ਪੰਜ ਭਾਗ ਹੋਣਗੇ। ਪਹਿਲੇ ਚਾਰ ਭਾਗਾਂ ਵਿਚ 02-02 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰੇਕ ਭਾਗ ਵਿਚੋਂ 01-01 ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਲਾਜ਼ਮੀ ਹੋਵੇਗਾ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ (08) ਅੰਕ ਹੋਣਗੇ। ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਪੰਜਵੇਂ ਭਾਗ ਵਿਚ ਸਾਰੇ ਸਿਲੇਬਸ ਵਿਚੋਂ 01-01 ਅੰਕ ਦੇ ਛੇ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ, ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ 05 ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ ਦੇਣਾ ਲਾਜ਼ਮੀ ਹੋਵੇਗਾ। ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ-ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

ਨੋਟ: ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ 13 ਅੰਕਾਂ ਦੀ ਹੈ, ਜੋ ਕਾਲਜ ਵੱਲੋਂ ਨਿਰਧਾਰਿਤ ਦਿਸ਼ਾ ਨਿਰਦੇਸ਼ਾਂ ਅਨੁਸਾਰ ਥਿਊਰੀ ਅੰਕਾਂ ਤੋਂ ਵੱਖਰੀ ਹੋਵੇਗੀ। ਇਸ ਪੇਪਰ ਦੇ ਕੁੱਲ ਅੰਕ 37+13 = 50 ਹਨ।

ਕੋਰਸ ਦਾ ਉਦੇਸ਼ Course Objective

- ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਸਾਹਿਤਕ ਰੁਚੀਆਂ ਪੈਦਾ ਕਰਨਾ।
- ਆਲੋਚਨਾਤਮਕ ਰੁਚੀਆਂ ਵਿਕਸਤ ਕਰਨਾ।
- ਮਾਤ ਭਾਸ਼ਾ ਦੀ ਸਮਝ ਨੂੰ ਵਿਕਸਤ ਕਰਨਾ।

ਪਾਠ-ਕ੍ਰਮ ਨਤੀਜੇ Course Outcomes (COs)

- ਵਿਦਿਆਰਥੀ ਦੀ ਸਾਹਿਤਕ ਸੋਚ-ਸਮਝ ਵਿਕਸਤ ਹੋਵੇਗੀ।
- ਵਿਦਿਆਰਥੀ ਵਿਚ ਸਾਹਿਤ ਰੁਚੀਆਂ ਵਿਕਸਤ ਹੋਣਗੀਆਂ।
- ਵਿਦਿਆਰਥੀ ਨੂੰ ਸਾਹਿਤ ਸਿਰਜਣਾ ਦੀ ਸੰਭਾਵਨਾ ਵਧੇਗੀ।
- ਵਿਦਿਆਰਥੀ ਕਿਸੇ ਵੀ ਵਿਸ਼ੇ ਦਾ ਗਹਿਨ ਅਧਿਐਨ ਕਰਨ ਦੇ ਕਾਬਲ ਹੋਵੇਗਾ।
- ਵਿਦਿਆਰਥੀ ਮਾਤ ਭਾਸ਼ਾ ਦੇ ਵਿਕਾਸ ਵਿਚ ਵਿਸ਼ੇਸ ਯੋਗਦਾਨ ਪਾਉਣਗੇ।

ਪਾਠ-ਕ੍ਰਮ

ਭਾਗ-ਪਹਿਲਾ

ਸਾਹਿਤ ਦੇ ਰੰਗ, ਡਾ. ਮਹਿਲ ਸਿੰਘ (ਸੰਪਾ.), ਰਵੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।
ਭਾਗ ਪਹਿਲਾ - ਕਵਿਤਾ ਅਤੇ ਕਹਾਣੀ, ਡਾ. ਮਹਿਲ ਸਿੰਘ ਅਤੇ ਡਾ. ਆਤਮ ਰੰਧਾਵਾ (ਸਹਿ ਸੰਪਾ.)
(ਕਵਿਤਾ ਭਾਗ ਵਿਚੋਂ ਪ੍ਰਸੰਗ ਸਹਿਤ ਵਿਆਖਿਆ/ਕਵਿਤਾ ਦਾ ਵਿਸ਼ਾ-ਵਸਤੂ। ਕਹਾਣੀ ਭਾਗ ਵਿਚੋਂ ਸਾਰ/ਵਿਸ਼ਾ-ਵਸਤੂ)

ਭਾਗ-ਦੂਜਾ

ਸੰਸਾਰ ਦੀਆਂ ਪ੍ਰਸਿੱਧ ਹਸਤੀਆਂ
ਪ੍ਰਿੰ. ਤੇਜਾ ਸਿੰਘ ਅਤੇ ਹਰਨਾਮ ਸਿੰਘ ਸ਼ਾਨ (ਸੰਪਾ.), ਪੰਜਾਬੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।
(ਜੀਵਨੀ 01 ਤੋਂ 09 ਤੱਕ, ਵਿਸ਼ਾ-ਵਸਤੂ/ਸਾਰ/ਨਾਇਕ ਬਿੰਬ)

ਭਾਗ-ਤੀਜਾ

(ੳ) ਪੈਰ੍ਹਾ ਰਚਨਾ
(ਅ) ਪੈਰ੍ਹਾ ਪੜ੍ਹ ਕੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ।

ਭਾਗ-ਚੌਥਾ

(ੳ) ਪੰਜਾਬੀ ਭਾਸ਼ਾ : ਨਿਕਾਸ ਤੇ ਵਿਕਾਸ
(ਅ) ਭਾਸ਼ਾ ਵੰਨਗੀਆਂ : ਭਾਸ਼ਾ ਦਾ ਟਕਸਾਲੀ ਰੂਪ, ਭਾਸ਼ਾ ਅਤੇ ਉਪ-ਭਾਸ਼ਾ ਦਾ ਅੰਤਰ, ਪੰਜਾਬੀ ਉਪ-ਭਾਸ਼ਾਵਾਂ ਦੇ ਪਛਾਣ-ਚਿੰਨ੍ਹ

B.Sc. (Computer Science)
SEMESTER-I
BPBI-1102
ਮੁਢਲੀ ਪੰਜਾਬੀ
(In Lieu of Compulsory Punjabi)

ਸਮਾਂ : 3 ਘੰਟੇ ਕ੍ਰੈਡਿਟ ਪ੍ਰਤੀ ਹਫਤਾ : 04
ਕੁੱਲ ਘੰਟੇ : 60 ਥਿਊਰੀ ਅੰਕ : 37, ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ : 13, ਕੁੱਲ ਅੰਕ : 50

ਅੰਕ-ਵੰਡ ਅਤੇ ਪ੍ਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

- ਪਹਿਲੇ ਭਾਗ ਵਿਚੋਂ ਚਾਰ ਵਰਣਨਾਤਮਕ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਤਿੰਨ ਪ੍ਰਸ਼ਨਾਂ ਦਾ ਉੱਤਰ ਦੇਣਾ ਲਾਜ਼ਮੀ ਹੈ। ਹਰ ਪ੍ਰਸ਼ਨ ਦੇ ਚਾਰ-ਚਾਰ ਅੰਕ ਹਨ। ਭਾਗ ਦੂਸਰਾ ਵਿਚੋਂ ਦੋ-ਦੋ ਅੰਕ ਦੇ ਪੰਜ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਸਾਰੇ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹਨ। ਭਾਗ ਤੀਸਰਾ ਵਿਚੋਂ ਤਿੰਨ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਲਾਜ਼ਮੀ ਹਨ ਜਿਨ੍ਹਾਂ ਦੇ ਪੰਜ-ਪੰਜ ਅੰਕ ਹਨ। ਭਾਗ ਚੌਥਾ ਵਿਚ ਪੰਜ ਅਸ਼ੁੱਧ ਸ਼ਬਦਾਂ ਨੂੰ ਸ਼ੁੱਧ ਕਰਕੇ ਲਿਖਣਾ ਹੋਵੇਗਾ।
  ਨੋਟ: ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ 13 ਅੰਕਾਂ ਦੀ ਹੈ, ਜੋ ਕਾਲਜ ਵੱਲੋਂ ਨਿਰਧਾਰਿਤ ਦਿਸ਼ਾ ਨਿਰਦੇਸ਼ਾਂ ਅਨੁਸਾਰ ਥਿਊਰੀ ਅੰਕਾਂ ਤੋਂ ਵੱਖਰੀ ਹੋਵੇਗੀ। ਇਸ ਪੇਪਰ ਦੇ ਕੁਲ ਅੰਕ 37+13 = 50 ਹਨ।

ਕੋਰਸ ਦਾ ਉਦੇਸ਼ Course Objective

- ਵਿਦਿਆਰਥੀ ਨੂੰ ਸ਼ੁੱਧ ਪੰਜਾਬੀ ਪੜ੍ਹਨਾ-ਲਿਖਣਾ ਸਿਖਾਉਣਾ।
- ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੀਆਂ ਵਿਆਕਰਨਕ ਬਾਰੀਕੀਆਂ ਤੋਂ ਜਾਣੂ ਕਰਾਉਣਾ।
- ਸ਼ੁੱਧ ਸੰਚਾਰ ਨੂੰ ਵਿਕਸਤ ਕਰਨਾ।

ਪਾਠ-ਕ੍ਰਮ ਨਤੀਜੇ Course Outcomes (COs)

- ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਅਤੇ ਗੁਰਮੁਖੀ ਲਿਪੀ ਦੀ ਸਿਖਲਾਈ ਵਿਚ ਮੁਹਾਰਤ ਹਾਸਿਲ ਕਰਨਗੇ।
- ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਵਿਚ ਮੁਹਾਰਨੀ, ਲਗਾਂ-ਮਾਤਰਾਂ, ਸਵਰ ਅਤੇ ਵਿਅੰਜਨ ਦੀ ਪਛਾਣ ਅਤੇ ਵਰਤੋਂ ਦੁਆਰਾ ਉਨ੍ਹਾਂ ਦੀ ਸਮਝ ਨੂੰ ਵਿਕਸਿਤ ਹੋਵੇਗੀ।
- ਪੰਜਾਬੀ ਸ਼ਬਦ-ਜੋੜਾਂ ਦੀ ਜਾਣਕਾਰੀ ਹਾਸਿਲ ਕਰਕੇ ਉਹ ਸ਼ੁੱਧ ਪੰਜਾਬੀ ਲਿਖਣ-ਪੜ੍ਹਨ ਦੇ ਸਮਰੱਥ ਹੋਣਗੇ।
- ਉਹ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੇ ਵਿਆਕਰਨ ਪ੍ਰਬੰਧ ਦੀ ਜਾਣਕਾਰੀ ਹਾਸਿਲ ਕਰਨਗੇ।

ਪਾਠ-ਕ੍ਰਮ

ਭਾਗ-ਪਹਿਲਾ

(ੳ) ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਤੇ ਗੁਰਮੁਖੀ ਲਿਪੀ :
ਨਾਮਕਰਣ ਤੇ ਸੰਖੇਪ ਜਾਣ-ਪਛਾਣ: ਗੁਰਮੁਖੀ ਵਰਣਮਾਲਾ, ਅੱਖਰ ਕ੍ਰਮ, ਸਵਰ ਵਾਹਕ (ਓ, ਅ, ੲ), ਲਗਾਂ-ਮਾਤਰਾਂ, ਪੈਰ ਵਿਚ ਬਿੰਦੀ ਵਾਲੇ ਵਰਨ, ਪੈਰ ਵਿਚ ਪੈਣ ਵਾਲੇ ਵਰਨ, ਬਿੰਦੀ, ਟਿੱਪੀ, ਅੱਧਕ
(ਅ) ਸਿਖਲਾਈ ਤੇ ਅਭਿਆਸ

ਭਾਗ-ਦੂਜਾ

ਗੁਰਮੁਖੀ ਆਰਥੋਗਰਾਫੀ ਅਤੇ ਉਚਾਰਨ :
ਸਵਰ, ਵਿਅੰਜਨ : ਮੁਢਲੀ ਜਾਣ-ਪਛਾਣ ਅਤੇ ਉਚਾਰਨ, ਮੁਹਾਰਨੀ, ਲਗਾਂ-ਮਾਤਰਾਂ ਦੀ ਪਛਾਣ

ਭਾਗ-ਤੀਜਾ

ਪੰਜਾਬੀ ਸ਼ਬਦ-ਜੋੜ : ਮੁਕਤਾ (ਦੋ ਅੱਖਰਾਂ ਵਾਲੇ ਸ਼ਬਦ, ਤਿੰਨ ਅੱਖਰਾਂ ਵਾਲੇ ਸ਼ਬਦ), ਸਿਹਾਰੀ ਵਾਲੇ ਸ਼ਬਦ, ਬਿਹਾਰੀ ਵਾਲੇ ਸ਼ਬਦ, ਔਂਕੜ ਵਾਲੇ ਸ਼ਬਦ, ਦੁਲੈਂਕੜ ਵਾਲੇ ਸ਼ਬਦ, ਲਾਂ ਵਾਲੇ ਸ਼ਬਦ, ਦੁਲਾਵਾਂ ਵਾਲੇ ਸ਼ਬਦ, ਹੋੜੇ ਵਾਲੇ ਸ਼ਬਦ, ਕਨੌੜੇ ਵਾਲੇ ਸ਼ਬਦ, ਲਗਾਖਰ (ਬਿੰਦੀ, ਟਿੱਪੀ, ਅੱਧਕ) ਵਾਲੇ ਸ਼ਬਦ

ਭਾਗ-ਚੌਥਾ

ਸ਼ੁੱਧ-ਅਸ਼ੁੱਧ ਸ਼ਬਦ

B.Sc. (Computer Science)

SEMESTER-I

BPHC-1104: PUNJAB HISTORY & CULTURE (From Earliest Times to C 320)

(Special Paper in lieu of Punjabi compulsory)
(For those students who are not domicile of Punjab)

Time: 3 Hours **Total. Marks: 50**
Credit Hours (per week):04 **Theory: 37**
Total Hours:60 **Internal Assessment: 13**

Instructions for the Paper Setter:
The question paper consists of five units: I, II, III, IV and V. Units I, II, III and IV will have two questions each. Each question carries 8 marks. The students are to attempt one question from each unit approximately in 800 words. Unit-V consists of 7 short answer type questions to be set from the entire syllabus. Students are to attempt any 5 questions in about 20 words each. Each question carries 1 mark.
Note: The examiner is to set the question paper in two languages: English & Hindi.

Course Objectives:

1.	The main objective of this course is to educate the history and culture of the Ancient Punjab to the students who are not domicile of the Punjab.
2.	It aims to familiarize these students with the physical features of ancient Punjab and its impact on its history and culture. It also provides them information about the different sources to construct the history and culture of the ancient Punjab.
3.	The course intends to provide knowledge of social, economic, religious life of the Harrapan civilization, Indo-Aryans, teachings and impact of Jainism and Buddhism in the Punjab.

UNIT-I

1. Physical features of the Punjab and impact on history.
2. Sources of the ancient history of Punjab.

UNIT-II

3. Harappan Civilization: Town planning; social, economic and religious life of the Indus Valley People.
4. The Indo-Aryans: Original home and settlement in Punjab.

UNIT-III

5. Social, Religious and Economic life during Rig Vedic Age.6., Social, Religious and Economic life during later Vedic Age.

UNIT-IV

7. Teachings and impact of Buddhism.8. Jainism in the Punjab.

References: -

1. L. Joshi (ed),*History and Culture of the Punjab*, Art-I, Patiala, 1989 (3rd edition)
2. L.M. Joshi and Fauja Singh (ed*), History of Punjab*, Vol.I, Patiala 1977.
3. BudhaParkash,*Glimpses of Ancient Punjab*, Patiala, 1983.4. B.N. Sharma, *Life in Northern India*, Delhi. 1966.

Course Outcomes:

After completion of the course, the students will be able to learn:

CO-1	The history and culture of the Ancient Punjab.
CO-2	Physical features of ancient Punjab.
CO-3	The sources of the history of the Punjab.
CO-4	Social, economic, religious life of the Harrapan civilization and Vedic-Aryans.
CO-5	Teachings and impact of Jainism and Buddhism in the Punjab.

B.Sc. (Computer Science)
SEMESTER–I

COMPUTER SCIENCE
CSC-111: COMPUTER FUNDAMENTAL & INFORMATION TECHNOLOGY

Time: 3 Hours **Total Marks: 100**
Credit Hours (per week):4 **Theory Marks: 56**
Total Hours:60 **Theory Internal Assessment M: 19**
Practical Marks: 19
Practical Internal Assessment M: 06

Note: 1. Medium of Examination is English Language.
2.The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks.**

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks**

Course Objectives:

1.	This course will familiarise students with basics o computer, its components.
2.	Students will learn various peripheral devices.
3.	Students will learn different kind of operating systems, networks and role of information Systems.

UNIT–I

Introduction to computer and its uses: milestones in hardware and software, batch oriented/online/real time application.

Computer as a system: basic concepts, stored programs, functional units and their inter – relation, communication with the computer.

Data storage devices and media: primary storage: storage addressed, and capacity, type of memory: secondary storage; magnetic tape – data representation and R/W: magnetic disc, fixed & removable, data representation and R/W, Data organization, Compact Disc, DVD, Blu-ray Disc, Cloud Storage.

Input/output devices: Key–tape/diskette devices, light pen mouse and joystick, source data automation (MICR, OMR, and OCR), screen assisted data entry; portable/hand held terminals for data collection, vision input system, SD Cards (Secure Digital), Solid State drives (SSD) .**Printed output:** Serial, line, page, printers; plotters, visual output; voice response units.

Computer Viruses: Definition, Types of viruses, use of Antivirus software

UNIT-II

Data & Network Communication

Communication media: Twisted pair, Coaxial, Fibre optics, Wireless(Line of Sight & Satellite), Network Advantages, Types & Topologies, Communication using Network protocol/Network Interface card(NP/NIC), Transmission & Communication protocol/protocol(TCP/IP), Modems, Types of Operating systems: Multiuser, Multitasking & Multiprogramming and their examples.

Information Systems

Introduction to IT & its components, What is Information systems, Computer based information systems, Management Information System, Decision Support System, Expert System, Functional Information System, Open Information System, Transaction Processing System, System Development Process & System development Tools. Internet basics, Its uses and Applications.

References:

1. R.K. Taxali: Introduction to Software Packages, Galgotia Publications.
2. Introduction to Computer by P.K. Sinha
3. Windows Based Computer Courses by Gurvinder Singh & Rachpal Singh.
4. Peter Norton, Introduction to Computers, Glencoe, Macmillan/McGraw Hill. Kroenke, Business Computer System, McGraw Hill.
5. Patric, G.Mckeown, Living with the Computers, 2nd edition, HBT Publishers, USA.
6. Hussain & Hussain, Computer Technology, Applications & Social Implications, PHI.
7. MS-Office compiled by SYBIX
8. MS-Office BPB Publications.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Study the fundamental concepts of computers
CO-2.	Familiarize themselves with operating systems, peripheral devices, networking and internet.
CO-3.	Study the hardware and software concepts , input and output components of a computer system.
CO-4.	Demonstrate different communication medias.
CO-5.	Learn Information systems, system development life cycle, tools and its applications

B.Sc. (Computer Science)
Semester-I
(PRACTICAL)

Time: 3 hours **Practical Marks: 19**
Practical Internal Assessment M: 06

Credit Hours (per week):4
Total Hours:60

COMPUTER FUNDAMENTAL & INFORMATION TECHNOLOGY

Working of Internet:
Internet and its applications, Internet evolution, Working of Internet, Use of Internet, Overview of World Wide Web (Web Server and Client), Search engine, Uploading & Downloading files, Web Browsers, Working with E-mail.

MS–Word 2010:
Introduction to Word, Introduction to Parts of Word Window (Title Bar, Menu Bar, Tool Bar,
The Ruler, Status Area), Page Setup, Creating New Documents, Saving Documents, Opening an Existing documents, insert a second document into an open document, Editing and formatting in document, Headers and Footers, Spell Checking, Printing document, Creating a Table Using the Table Menu and table formatting, Borders and Shading, Templates and Wizards, Mail Merge.

MS Power Point 2010:
Introduction to MS Power point, Power point elements, Templates, Wizards, Views, Exploring Power Point Menu, Working with Dialog Boxes, Adding Text, Adding Title, Moving Text Area, Resizing Text Boxes, Adding Art, Starting a New Slide, Starting Slide Show, Saving presentation; Printing Slides, Views (View slide sorter view, notes view, outlines view), Formatting and enhancing text formatting, Creating Graphs (Displaying slide show and adding multi–media)

B.Sc. (Computer Science)
SEMESTER–I
PHY111A
MECHANICS
(THEORY)

Credit Hours (per week): 3

Time: 3 Hours **Total Hours: 45**

Maximum Marks: 25

Pass Marks: 35%

Note for paper setter and students:

1. **There will be five sections.**
2. **Section A carries 5 marks and is compulsory consisting of seven short answer type questions of 1 marks each covering the whole syllabus. The candidate will have to attempt five questions in section A.**
3. **Sections B, C, D and E will be set from units I, II, III & IV respectively and will consist of two questions of 5 marks each from the respective unit. The candidates are required to attempt one question from each of these sections.**
4. **Scientific calculator is allowed.**

Course Objectives: The purpose of the course is to provide the basic information about co-ordinate system and motion of particles in it, to understand the conservation laws and also to determine the difference between elastic and inelastic collisions. It includes applications of central force to the stability of circular orbits, Kepler's laws of planetary motion, orbital precession and Rutherford scattering, dynamics of rotating objects i.e. rigid bodies, angular velocity, the moment of inertia, the motion of rigid bodies and Euler equations. It also helps to understand the differences between types of forces and the inverse square force field.

Course Contents:

UNIT–I

Cartesian and spherical polar co–ordinate systems, area, volume, velocity and Acceleration in these systems. Solid angle, Relationship of conservation laws and symmetries of space and time.

UNIT–II

Various forces in Nature (Brief introduction) centre of mass, equivalent one body problem, central forces, equation of motion under central force, equation of orbit and turning points. Kepler Laws. Concept of Ether and Michel son–Morley experiment.

UNIT–III

Inertial frame of reference. Galilean transformation and Invariance. Non Inertial frames, Coriolis force and its applications. Variation of acceleration due to gravity with latitude. Foucault pendulum.

UNIT–IV

Elastic collision in Lab and C.M. system, velocities, angles and energies, cross section of elastic scattering, Rutherford scattering. Rigid Body motion; Rotational motion, principal moments and

Axes. Euler's equations, precession and elementary gyroscope.

References:

1. Mechanics, Berkeley Vol.–I by C. Kittle.
2. Mechanics, H.S. Hans & S.P. Puri.

Course Learning Outcomes	**On completing the course, the students will be able to:**
CO1	Learn the laws of motion reference frames, and its applications
CO2	Explain the application of central force to the stability of circular orbits, Kepler's laws of planetary motion, Orbital Precession and Rutherford scattering.
CO3	Understand the dynamics of rotating objects i.e. rigid bodies, angular velocity, the moment of inertia, parallel axis theorem, the inertia tensor, the motion of rigid bodies. non-inertial frames: pseudo forces, examples involving the centrifugal force and coriolis force
CO4	Develop understanding of special theory of relativity and its applications to understand length contraction, time dilation, and relativistic addition of velocities, conservation of momentum and variation of mass, relativistic momentum, relativistic energy, and mass energy relation.
CO5	Get information of the basics of material properties like, elasticity, elastic constants and their relation, torsion of a cylinder, bending of a beam, cantilever, beam supported at its ends and loaded in the middle.

B.Sc. (Computer Science)
SEMESTER–I

PHY111B

ELECTRICITY AND MAGNETISM

(THEORY)

Credit Hours (per week): 3

Time: 3 Hours **Total Hours: 45**

Maximum Marks: 25

Pass Marks: 35%

Note for paper setter and students:

1. **There will be five sections.**
2. **Section A carries 5 marks and is compulsory consisting of seven short answer type questions of 1 marks each covering the whole syllabus. The candidate will have to attempt five questions in section A.**
3. **Sections B, C, D and E will be set from units I, II, III & IV respectively and will consist of two questions of 5 marks each from the respective unit. The candidates are required to attempt one question from each of these sections.**
4. **Scientific calculator is allowed.**

Course Objectives: Course objective of this subject is to Apply knowledge of electricity and magnetism to explain natural physical processes and related technological advances.Use of calculus along with physical principles to effectively solve problems encountered in everyday life, further study in science, and in the professional world. Design experiments and acquire data in order to explore physical principles, effectively communicate results, and critically evaluate related scientific rules.

Course Contents:

UNIT–I

Basic ideas of Vector Calculus Gradient, Divergence, curl and their physical significance. Laplacian in rectangular, cylindrical and spherical coordinates. Coulomb's Law for point charges and continuous distribution of charges. Electric field due to dipole, line charge and sheet ofcharge. Electric flux, Gauss's Law and its applications. Gauss's divergence theorem and differential form of Gauss's Law. Green's theorem.

UNIT–II

Work and potential difference. Potential difference as line integral of field. Electric potential due to a point charge a group of point charges, dipole and quadrupole moments, long uniformly charged wire, charged disc. Stoke's theorem and its applications in Electrostatic field, curl E=0.Electric fields as gradient of scalar potential. Calculation of E due to a point charge and dipole from potential. Potential due to arbitrary charge distribution and multipole moments.

UNIT–III

Poisson and Laplace's equation and their solutions in Cartesian and spherical coordinates. Concept of electrical images.Calculation of electric potential and field due to a point charge placed near an infinitely conducting sheet. Current and current density, equation of continuity. Microscopic form of Ohm's Law ($J=\sigma E$) and conductivity, Failure of Ohm's Law. Invariance of charge.

UNIT–IV

Field of a point charge moving with constant velocity.Interaction between moving charges and force between parallel currents. Behaviour of various substances in magnetic field. Definition of M and H and their relation to free and bound currents.Permeability and susceptibility and their interrelationship. Orbital motion of electrons and diamagnetism, paramagnetism and ferromagnetism.

References:

1. Fundamentals of Electricity and Magnetism by Arthur F. Kipp.
2. Electricity and Magnetism, Berkeley Physics Course, Vol. II by E.M. Purcell.
3. Introduction to Classical Electrodynamics by David Griffith.
4. EM Waves and Radiating System by Edward C. Jordan and K.G. Balmain.
5. Fields and Waves Electromagnetic by David K. Cheng.
6. Electricity & Magnetism-T.S. Bhatia and Gurpreet Singh, Vishal Publications

Course Learning Outcomes	**On completing the course, the students will be able to:**
CO1	Apply knowledge of electricity and magnetism to explain natural physical processes and related technological advances.
CO2	Understand the use of the Stoke's and Gauss Divergence theorems for solution of different physics problems.
CO3	Explain the concept of electric current and related concepts.
CO4	Understand about electric current and related concepts.
CO5	Explain the phenomenon of magnetism, types of magnetic materials and their properties.

B.Sc. (Computer Science)

SEMESTER–I

PHY111P

(PRACTICAL)

Credit Hours (per week): 4.5

Time: 3 Hours **Maximum Marks: 25**

Pass Marks: 35%

General Guidelines for Practical Examination:

I. The distribution of marks is as follows: **25 Marks**

i) One experiment: **10 Marks**

ii) Brief Theory : 5 **Marks**

iii) Viva–Voce: **5Marks**

iv) Record (Practical file):**5Marks**

II. There will be one sessions of 3 hours duration. The paper will have one session.

Paper will consist of 8 experiments out of which an examinee will mark 6 experiments and one of these is to be allotted by the external examiner.

III. Number of candidates in a group for practical examination should not exceed 12.

IV. In a single group no experiment be allotted to more than three examinee in any group.

Course Objectives: Course objective of this subject is to follow the pragmatic way of learning and describe the basic experimental skills in the students. They will be able to demonstrate and able to evaluate the resistance, modulus of rigidity, torque and moment of inertia of body experimentally. They will also learn about the energy consumption by demonstrating the energy meter experiment.

Course Contents:

1. To determine low resistance with Carey Fosters Bridge.
2. To determine the resistance and specific resistance of copper with the help of Kelvin's double bridge.
3. To study the variation of resistance of a filament of a bulb with its temperature.
4. Capacitance by flashing and quenching of a neon lamp.
5. Measurement of Capacitance, determination of permittivity of a medium air and relative permitivity by de–Sauty's bridge.
6. To determined I using Anderson Bridge.
7. Exercise on fitting of given data to straight line and calculation of probable error.
8. To study the dependence of moment of inertia on distribution of mass (by noting time

periods of oscillations using objects of various geometrical shapes but of same mass).

9. To establish relationship between torque and angular acceleration using fly wheel.
10. To find the moment of inertia of a flywheel.
11. Study of bending of beams and determination of young's Modulus.
12. Determination of Poissons or rubber plastic.
13. To find young's modulus, modulus of rigidity & Poisson ratio by Searle's method.
14. To study flow of water through capillary tubes of different length and area of cross section of (at least two each) and calculate coefficient of viscosity.
15. To determine energy transfer, coefficient of restitution and verify laws of conservation of linear momentum and kinetic energy in elastic collisions using one dimensional collisions of hanging spheres.
16. Kundt's tube.
17. Energy meter.

References:

1. Practical Physics Vol. I, T.S. Bhatia, Gursharan Kaur, Iqbal Singh, Vishal Publications.
2. Practical Physics, C.L. Arora, S. Chand & Co.

Course Learning Outcomes	**On completing the course, the students will be able to:**
CO1	Determine low resistance with Carey Fosters Bridge.
CO2	Study the dependence of moment of inertia on distribution of mass (by noting time periods of oscillations using objects of various geometrical shapes but of same mass).
CO3	Find Moment of Inertia and establish relationship between torque and angular acceleration using fly wheel.
CO4	Determine the resistance and specific resistance of copper with the help of Kelvin's double bridge.
CO5	Study the measure of Capacitance, determination of permittivity of a medium air and relative permitivity by de–Sauty's bridge.

B.Sc. (Computer Science)
SEMESTER–I
MAT111A: ALGEBRA

Time: 3 Hours **Max. Marks: 50**
Medium: English **Theory Marks: 38**
Credit Hours(per week):4 **Internal Assessment: 12**
Total Hours:60

Instructions for the Paper Setters:

1. The question paper will consist of five sections namely Section-A which will be from entire syllabus (equally distributed from each unit), Section–B, C, D and E from UNIT-I, II, III and IV respectively.
2. The Section–A will consist of eight compulsory questions, each of one mark.
3. The Section–B, C, D& E will consist of two questions each. Students are to attempt any five questions in total by selecting at least one question from each section. Each question carries 6 marks.
4. Teaching time for this paper would be six periods per week.

COURSE OBJECTIVES:

1.	Algebra is a very unique discipline which is very abstract.
2.	The abstractness of Algebra causes the brain to think in totally new pattern.
3.	Algebra helps in expression of abstract ideas and easily students can learn matrix algebra, vector spaces, eigen values and eigen vectors, Cardon's and Descarte's methods of solving a system of equations and inequalities.
4.	Algebra describes the fundamental properties of real numbers that lead to the formal development of Real Analysis.

UNIT-I

Linear independence of row and column vectors. Row rank, Column rank of a matrix, Equivalence of column and row ranks, Nullity of a matrix, Applications of matrices to a system of linear (both homogeneous and non–homogeneous) equations. Theorems on consistency of a system of linear equations.

UNIT-II

Eigen values, Eigen vectors, minimal and the characteristic equation of a matrix. Cayley Hamilton theorem and its use in finding inverse of a matrix. Quadratic Forms, quadratic form as a product of matrices. The set of quadratic forms over a field.

UNIT-III

Congruence of quadratic forms and matrices. Congruent transformations of matrices. Elementary congruent transformations. Congruent reduction of a symmetric matrix. Matrix Congruence of skew– symmetric matrices. Reduction in the real field. Classification of real quadratic forms in variables. Definite, semi–definite and indefinite real quadratic forms. Characteristic properties of definite, semi– definite and indefinite forms.

UNIT-IV

Relations between the roots and coefficients of general polynomial equation in one variable. Transformation of equations and symmetric function of roots, Descarte's rule of signs, Newton's Method of divisors, Solution of cubic equations by Cardan method, Solution of biquadratic equations by Descarte's and Ferrari's Methods.

References:

1. K.B. Dutta: Matrix and Linear Algebra, Prentice Hall of India Pvt. Ltd., New Delhi (2002).
2. H.S. Hall and S.R. Knight: Higher Algebra, H.M. Publications, 1994.
3. Chandrika Parsad: Text book on Algebra and Theory of Equations, Pothishala Pvt.Ltd., Allahabad.

Course Outcomes:

On completing the course, the students will be able to:

CO-1.	solve problems based on matrices, vector spaces, eigen values and eigen vectors.
CO-2.	Check consistency and inconsistency of linear equations.
CO-3.	Understand the relation between roots and coefficients.

B.Sc. (Computer Science)
SEMESTER–I
MAT-111B: CALCULUS AND TRIGONOMETRY

Medium: English

Time: 3 Hours **Max. Marks: 50**

Credit Hours(per week):4 **Theory Marks: 37**

Total Hours:60 **Internal Assessment: 13**

Instructions for the Paper Setters:

1. The question paper will consist of five sections namely Section-A which will be from entire syllabus (equally distributed from each unit), Section–B, C, D and E from UNIT-I, II, III and IV respectively.
2. The Section–A will consist of seven compulsory questions, each of one mark.
3. The Section–B, C, D & E will consist of two questions each. Students are to attempt any five questions in total by selecting at least one question from each section. Each question carries 6 marks.
4. Teaching time for this paper would be six periods per week.

COURSE OBJECTIVES:

1. Calculus has widespread applications in science, economics, and engineering and can solve many problems for which algebra alone is insufficient.
2. Trigonometry is a branch of mathematics that studies relationships between side lengths and angles of triangles.
3. Students will apply calculus and Trigonometry in areas such as geodesy, surveying, celestial mechanics, and navigation.
4. Students will learn relationships to other branches of mathematics, in particular complex numbers, infinite series, logarithms and calculus.

UNIT-I

Real number system and its properties, lub, glb of sets of real numbers, limit of a function, Basic properties of limits, Continuous functions and classification of discontinuities, Uniform continuity.

UNIT-II

Differentiation of hyperbolic functions, Successive differentiation, Leibnitz theorem, Taylor's and Maclaurin's theorem with various forms of remainders, Indeterminate forms.

UNIT-III

De–Moivre's Theorem and its applications, circular and hyperbolic functions and their inverses.

UNIT-IV

Exponential and Logarithmic function of complex numbers, Expansion of trigonometric functions, Gregory's series, Summation of series.

References:

1. N. Piskunov: Differential and Integral Calculus, Peace Publishers, Moscow.
2. Gorakh Prasad: Differential Calculus, Pothishala Pvt. Ltd., Allahabad.
3. Erwin Kreyszig: Advanced Engineering Mathematics, John Wiley and Sons, 1999.
4. Shanti Narayan and P.K. Mittal: Differential Calculus, S Chand & Company.
5. Shanti Narayan and P.K. Mittal: Real Analysis, S Chand & Company.
6. Rajinder Pal Kaur: Calculus, First world Publication, Ludhiana.

Course Outcomes:

On completing the course, the students will be able to:

CO-1.	Acquaint themselves with the limits, functions, derivatives, integrals, and infinite series.
CO-2.	Associate Differential equations with the Mathematical modeling.
CO-3.	Solve multifarious differential equation that relates functions with its derivatives.
CO-4.	Know about concavity and convexity of the functions, Asymptotes and multiple points of a curve.
CO-5.	Have knowledge about applications in fields of engineering, physics, economics, and biology

B.Sc. (Computer Science)

SEMESTER–I
Course Code: ZDA111
Course Title- Drug Abuse: Problem, Management and Prevention
PROBLEM OF DRUG ABUSE
(Compulsory for all Under Graduate Classes)

Credit Hours (per week): 1.5 hrs.
Total Hours: 22.5 hrs.
Max. Marks: 50

Instructions for the Paper Setters:

Section–A: (15 Marks): It will consist of five short answer type questions. Candidates will be required to attempt three questions, each question carrying 05 marks. Answer to any of the questions should not exceed two pages.

Section–B: (20 Marks) It will consist of four essay type questions. Candidates will be required to attempt two questions, each question carrying 10 marks. Answer to any of the questions should not exceed four pages.

Section–C: (15 Marks) It will consist of two questions. Candidate will be required to attempt one question only. Answer to the question should not exceed 5 pages.

Course Objectives

The course aims to:

CO-1.	Generate the awareness against drug abuse.
CO-2.	Describe a variety of models and theories of addiction and other problems related to substance abuse.
CO-3.	Describe the behavioral, psychological, physical health and social impact of psychoactive substances.
CO-4.	Provide culturally relevant formal and informal education programs that raise awareness and support for substance abuse prevention and the recovery process.
CO-5.	Describe factors that increase likelihood for an individual, community or group to be at risk of substance use disorders.

UNIT–I

- **Meaning of Drug Abuse**

  Meaning, Nature and Extent of Drug Abuse in India and Punjab.

UNIT-II

- **Consequences of Drug Abuse for:**

  Individual : Education, Employment and Income.

  Family : Violence.

  Society : Crime.

  Nation : Law and Order problem.

UNIT-III

- **Management of Drug Abuse**

  Medical Management: Medication for treatment and to reduce withdrawal effects.

UNIT-IV

- Psychiatric Management: Counseling, Behavioral and Cognitive therapy.
- Social Management: Family, Group therapy and Environmental Intervention.

References:

1. Ahuja, Ram (2003), Social Problems in India, Rawat Publication, Jaipur.
2. Extent, Pattern and Trend of Drug Use in India, Ministry of Social Justice and Empowerment, Government of India, 2004.
3. Inciardi, J.A. 1981. The Drug Crime Connection. Beverly Hills: Sage Publications. 23
4. Jasjit Kaur Randhawa & Samreet Randhawa, "Drug Abuse-Problem, Management & Prevention", KLS, ISBN No. 978-81-936570-6-5, (2018).
5. Jasjit Kaur Randhawa & Samreet Randhawa, "Drug Abuse Problem, Management & Prevention", KLS, ISBN No. 978-81-936570-8-9, (2019).
6. Jasjit Kaur Randhawa & Samreet Randhawa, "ਡਰੱਗਜ਼ ਦੁਰਵਰਤੋਂ-(ਨਸ਼ਾਖੋਰੀ) ਸਮੱਸਿਆ, ਪ੍ਰਬੰਧਨ ਅਤੇ ਰੋਕਥਾਮ", KLS, ISBN No. 978-81-936570-7-1, (2018).
7. Jasjit Kaur Randhawa, "Drug Abuse -Management & Prevention", KLS, ISBN No. 978-93-81278-80-2, (2018).
8. Kapoor. T. (1985) Drug epidemic among Indian Youth, New Delhi: Mittal Pub.
9. Modi, Ishwar and Modi, Shalini (1997) Drugs: Addiction and Prevention, Jaipur: Rawat Publication.
10. National Household Survey of Alcohol and Drug abuse. (2003) New Delhi, Clinical Epidemiological Unit, All India Institute of Medical Sciences, 2004.
11. Rama Gandotra & Jasjit Kaur Randhawa, "ਡਰੱਗਜ਼ ਦੁਰਵਰਤੋਂ-(ਨਸ਼ਾਖੋਰੀ) ਪ੍ਰਬੰਧਨ ਅਤੇ ਰੋਕਥਾਮ", KLS, ISBN No. 978-93-81278-87-1, (2018).
12. Sain, Bhim 1991, Drug Addiction Alcoholism, Smoking obscenity New Delhi: Mittal Publications.
13. Sandhu, Ranvinder Singh, 2009, Drug Addiction in Punjab: A Sociological Study. Amritsar: Guru Nanak Dev University.
14. Singh, Chandra Paul 2000. Alcohol and Dependence among Industrial Workers: Delhi: Shipra.

15. Sussman, S and Ames, S.L. (2008). Drug Abuse: Concepts, Prevention and Cessation, Cambridge University Press.
16. World Drug Report 2010, United Nations office of Drug and Crime.
17. World Drug Report 2011, United Nations office of Drug and Crime.

Course Outcomes:

The students will be able:

CO-1.	To describe issues of cultural identity, ethnic background, age and gender in prevention, treatment and recovery.
CO-2.	To describe warning sign, symptoms, and the course of substance use disorders.
CO-3.	To describe principles and philosophy of prevention, treatment and recovery.
CO-4.	To describe current and evidenced-based approaches practiced in the field of addictions.

B.Sc. (Computer Science)
Semester – II

Sr. No.	Course Code	Course Name		Marks				Page No.
				Theory	Practical	Internal Assessment	Total	
1	BENC-1205	ENGLISH (COMPULSORY)		37	-	13	50	293-294
2	BPBI-1201/BPBI-1202/BPHC-1204	Punjabi/Basic Punjabi (Mudhli Punjabi) (Compulsory)/ Punjab History & Culture		37		13	50	295-298
3	CSC-121	COMPUTER SCIENCE (Programming Using C)		56	19	19Theory 06 Practical	100	299-301
4	PHY121A	Physics	RELATIVITY AND ELECTROMAGNETISM	25	-	25	100	302-307
	PHY121B		VIBRATION AND WAVES	25	-			
	PHY121P		Practical		25			
5	MAT-121A	Mathematics	CALCULUS AND DIFFERENTIAL EQUATIONS	38	-	12	50	308-311
	MAT-121B		Calculus	37		13	50	
6	ZDA121		DRUG ABUSE					312-314

B.Sc. (Computer Science)
SEMESTER – II
BENC-1205: ENGLISH (COMPULSORY)

Time: 3 Hours **Max. Marks: 50**
Credit Hours(per week):04 **Theory: 37**
Internal Assessment: 13

Division of Marks:
Instructions for the Paper Setter and Distribution of Marks:
The question paper will consist of three sections and distribution of marks will be as under:
Section A: 10 Marks
Section B: 17 Marks
Section C: 10 Marks
Section–A: **Twelve (12)** Questions on the usage of grammar related to the prescribed units of ***Murphy's English Grammar*** will be set for the students to attempt **any Ten (10)** (1X10= 10 Marks)
Section–B: EIGHT (8) questions (four from each literary text) on theme, characterization, tone and style etc. will be set. The students will be required to attempt **any Four** questions, choosing at least TWO from each prescribed text. The answer to each question should not exceed 15-20 sentences. (4X3=12 Marks)
1.The students will be required to write a **Personal Letter** on ONE of the TWO situations/ issues provided in the question paper.
(1X5= 5 Marks)
Section–C: **Two q**uestions, one from the each literary text, will be set. The students will be required to answer any one.
(1X5=5 Marks)
1.The students will be required to answer **Five** questions from the **Comprehension of Passage** set from the book ***Prose for Young Learners***. (5X1=5 Marks)

Course Objectives:

1.	To acquaint students with the characteristics of various literary genres.
2.	To develop analytical skills and critical thinking through close reading of literary texts.
3.	To cultivate appreciation of language as an artistic medium and to help them understand the importance of forms, elements and style that shape literary works.
4.	To enable students to understand that literature is an expression of human values within a historical and social context.

Course Contents
1) Stories at Sr.No.7, 9,10,11,12 from *Tales of Life*.
2) Essays at Sr.No.7, 8, 9, 10, 11 from *Prose for Young Learners.*
3) Unit 19-25, 72-81 from *Murphy's English Grammar*.

References:

1. *Tales of Life* (Guru Nanak Dev University, Amritsar)
2. *Prose for Young Learners* (Guru Nanak Dev University, Amritsar)
3. *Murphy's English Grammar 4th Edition (by Raymond Murphy) CUP*

Course Outcomes:

CO-1.	Appreciate the writings of various Indian and foreign story and prose writers and relate them to their sociocultural milieu.
CO-2.	Comprehend the meaning of texts and answer questions related to situations, episodes, themes and characters depicted in them.
CO-3.	Make correct usage of tenses, articles and nouns.
CO-4.	Enrich their vocabulary and use new words in their spoken and written language.
CO-5.	Independently write personal letters to their family and friends on various issues

B.Sc. (Computer Science)
SEMESTER-II
BPBI-1201
ਲਾਜ਼ਮੀ ਪੰਜਾਬੀ

ਸਮਾਂ : 3 ਘੰਟੇ ਕ੍ਰੈਡਿਟ ਪ੍ਰਤੀ ਹਫਤਾ : 04
ਕੁੱਲ ਘੰਟੇ : 60 ਥਿਊਰੀ ਅੰਕ : 37, ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ : 13, ਕੁੱਲ ਅੰਕ : 50

ਅੰਕ-ਵੰਡ ਅਤੇ ਪ੍ਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

- ਸਿਲੇਬਸ ਦੇ ਚਾਰ ਭਾਗ ਹਨ ਪਰ ਪ੍ਰਸ਼ਨ-ਪੱਤਰ ਦੇ ਪੰਜ ਭਾਗ ਹੋਣਗੇ। ਪਹਿਲੇ ਚਾਰ ਭਾਗਾਂ ਵਿਚ 02-02 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰੇਕ ਭਾਗ ਵਿਚੋਂ 01-01 ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਲਾਜ਼ਮੀ ਹੋਵੇਗਾ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ (08) ਅੰਕ ਹੋਣਗੇ। ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਪੰਜਵੇਂ ਭਾਗ ਵਿਚ ਸਾਰੇ ਸਿਲੇਬਸ ਵਿਚੋਂ 01-01 ਅੰਕ ਦੇ ਛੇ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ, ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ 05 ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ ਦੇਣਾ ਲਾਜ਼ਮੀ ਹੋਵੇਗਾ। ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ-ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।
  ਨੋਟ: ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ 13 ਅੰਕਾਂ ਦੀ ਹੈ, ਜੋ ਕਾਲਜ ਵੱਲੋਂ ਨਿਰਧਾਰਿਤ ਦਿਸ਼ਾ ਨਿਰਦੇਸ਼ਾਂ ਅਨੁਸਾਰ ਥਿਊਰੀ ਅੰਕਾਂ ਤੋਂ ਵੱਖਰੀ ਹੋਵੇਗੀ। ਇਸ ਪੇਪਰ ਦੇ ਕੁੱਲ ਅੰਕ 37+13 = 50 ਹਨ।

ਕੋਰਸ ਦਾ ਉਦੇਸ਼ Course Objective

- ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਸਾਹਿਤਕ ਰੁਚੀਆਂ ਪੈਦਾ ਕਰਨਾ।
- ਆਲੋਚਨਾਤਮਕ ਰੁਚੀਆਂ ਨੂੰ ਵਿਕਸਤ ਕਰਨਾ।
- ਭਾਸ਼ਾਈ ਗਿਆਨ ਵਿਚ ਵਾਧਾ ਕਰਨਾ।

ਪਾਠ-ਕ੍ਰਮ ਨਤੀਜੇ Course Outcomes (COs)

- ਵਿਦਿਆਰਥੀ ਦੀ ਸੋਚ-ਸਮਝ ਵਿਕਸਤ ਹੋਵੇਗੀ।
- ਵਿਦਿਆਰਥੀ ਵਿਚ ਸਾਹਿਤਕ ਰੁਚੀਆਂ ਪ੍ਰਫਲਿੱਤ ਹੋਣਗੀਆਂ।
- ਵਿਦਿਆਰਥੀ ਵਿਚ ਸਾਹਿਤ ਸਿਰਜਣਾ ਦੀ ਸੰਭਵਨਾ ਵਧੇਗੀ।
- ਵਿਦਿਆਰਥੀ ਸੰਬੰਧਿਤ ਵਿਸ਼ੇ ਦਾ ਗਹਿਨ ਅਧਿਐਨ ਕਰਨ ਦੇ ਸੁਯੋਗ ਹੋਵੇਗਾ।
- ਵਿਦਿਆਰਥੀ ਭਾਸ਼ਾਈ ਬਣਤਰ ਤੋਂ ਜਾਣੂ ਹੋਵੇਗਾ।

ਪਾਠ-ਕ੍ਰਮ

ਭਾਗ-ਪਹਿਲਾ

ਸਾਹਿਤ ਦੇ ਰੰਗ, ਡਾ. ਮਹਿਲ ਸਿੰਘ (ਸੰਪਾ.), ਰਵੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।
ਭਾਗ ਦੂਜਾ - ਵਾਰਤਕ ਅਤੇ ਰੇਖਾ-ਚਿੱਤਰ, ਡਾ. ਪਰਮਿੰਦਰ ਸਿੰਘ, ਡਾ. ਭੁਪਿੰਦਰ ਸਿੰਘ ਅਤੇ ਡਾ. ਕੁਲਦੀਪ ਸਿੰਘ ਢਿੱਲੋਂ (ਸਹਿ ਸੰਪਾ.)
(ਵਾਰਤਕ ਭਾਗ ਵਿਚੋਂ ਸਾਰ/ਵਿਸ਼ਾ-ਵਸਤੂ। ਰੇਖਾ-ਚਿੱਤਰ ਭਾਗ ਵਿਚੋਂ ਸਾਰ/ਨਾਇਕ ਬਿੰਬ)

ਭਾਗ-ਦੂਜਾ

ਸੰਸਾਰ ਦੀਆਂ ਪ੍ਰਸਿੱਧ ਹਸਤੀਆਂ
ਪ੍ਰਿੰ. ਤੇਜਾ ਸਿੰਘ ਅਤੇ ਹਰਨਾਮ ਸਿੰਘ ਸ਼ਾਨ (ਸੰਪਾ.), ਪੰਜਾਬੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।
(ਜੀਵਨੀ 10 ਤੋਂ 18 ਤੱਕ, ਜੀਵਨੀ ਦਾ ਵਿਸ਼ਾ-ਵਸਤੂ/ਸਾਰ/ਨਾਇਕ ਬਿੰਬ)

ਭਾਗ-ਤੀਜਾ

(ੳ) ਦਫ਼ਤਰੀ ਚਿੱਠੀ ਪੱਤਰ
(ਅ) ਅਖਾਣ ਅਤੇ ਮੁਹਾਵਰੇ

ਭਾਗ-ਚੌਥਾ

(ੳ) ਸ਼ਬਦ-ਬਣਤਰ ਅਤੇ ਸ਼ਬਦ-ਰਚਨਾ : ਪਰਿਭਾਸ਼ਾ ਅਤੇ ਮੁੱਢਲੇ ਸੰਕਲਪ
(ਅ) ਸ਼ਬਦ-ਸ਼੍ਰੇਣੀਆਂ

B.Sc. (Computer Science)
SEMESTER-II

BPBI-1202
ਮੁਢਲੀ ਪੰਜਾਬੀ
(In Lieu of Compulsory Punjabi)

ਸਮਾਂ : 3 ਘੰਟੇ ਕ੍ਰੈਡਿਟ ਪ੍ਰਤੀ ਹਫਤਾ : 04
ਕੁੱਲ ਘੰਟੇ : 60 ਥਿਊਰੀ ਅੰਕ : 37, ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ : 13, ਕੁੱਲ ਅੰਕ : 50

ਅੰਕ-ਵੰਡ ਅਤੇ ਪ੍ਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

- ਭਾਗ ਪਹਿਲਾ ਵਿਚੋਂ ਚਾਰ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਤਿੰਨ ਪ੍ਰਸ਼ਨਾਂ ਦਾ ਉੱਤਰ ਦੇਣਾ ਲਾਜ਼ਮੀ ਹੈ। ਹਰ ਪ੍ਰਸ਼ਨ ਦੇ ਚਾਰ-ਚਾਰ ਅੰਕ ਹਨ। ਭਾਗ ਦੂਸਰਾ ਵਿਚੋਂ ਦੋ-ਦੋ ਅੰਕ ਦੇ ਪੰਜ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਸਾਰੇ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹਨ। ਭਾਗ ਤੀਸਰਾ ਵਿਚੋਂ ਚਾਰ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਲਾਜ਼ਮੀ ਹਨ। ਭਾਗ ਚੌਥਾ ਵਿਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨਾ ਹੋਵੇਗਾ।
  ਨੋਟ: ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ 13 ਅੰਕਾਂ ਦੀ ਹੈ, ਜੋ ਕਾਲਜ ਵੱਲੋਂ ਨਿਰਧਾਰਿਤ ਦਿਸ਼ਾ ਨਿਰਦੇਸ਼ਾਂ ਅਨੁਸਾਰ ਥਿਊਰੀ ਅੰਕਾਂ ਤੋਂ ਵੱਖਰੀ ਹੋਵੇਗੀ। ਇਸ ਪੇਪਰ ਦੇ ਕੁਲ ਅੰਕ 37+13 = 50 ਹਨ।

ਕੋਰਸ ਦਾ ਉਦੇਸ਼ Course Objective

- ਵਿਦਿਆਰਥੀ ਅੰਦਰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੀ ਸਮਝ ਵਿਕਸਤ ਕਰਨਾ।
- ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੇ ਵਿਆਕਰਨਕ ਪ੍ਰਬੰਧ ਸੰਬੰਧੀ ਗਿਆਨ ਕਰਾਉਣਾ।
- ਸਿਖਲਾਈ ਤੇ ਅਭਿਆਸ ਦੁਆਰਾ ਪੰਜਾਬੀ ਭਾਸ਼ਾ 'ਤੇ ਪਕੜ ਵਧਾਉਣਾ।

ਪਾਠ-ਕ੍ਰਮ ਨਤੀਜੇ Course Outcomes (COs)

- ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ ਬਾਰੇ ਸਮਝ ਹੋਰ ਵਿਕਸਿਤ ਹੋਵੇਗੀ।
- ਉਹ ਪੰਜਾਬੀ ਸ਼ਬਦ-ਬਣਤਰ ਦੀ ਜਾਣਕਾਰੀ ਹਾਸਿਲ ਕਰਕੇ ਭਾਸ਼ਾਈ ਗਿਆਨ ਨੂੰ ਵਿਕਸਿਤ ਕਰਨਗੇ।
- ਪੰਜਾਬੀ ਸ਼ਬਦ-ਰਚਨਾ ਸੰਬੰਧੀ ਜਾਣਕਾਰੀ ਉਨ੍ਹਾਂ ਦੇ ਗਿਆਨ ਵਿਚ ਵਾਧਾ ਕਰੇਗੀ।

ਪਾਠ-ਕ੍ਰਮ

ਭਾਗ-ਪਹਿਲਾ

ਪੰਜਾਬੀ ਸ਼ਬਦ-ਬਣਤਰ :
ਧਾਤੂ, ਵਧੇਤਰ (ਅਗੇਤਰ, ਮਧੇਤਰ, ਪਿਛੇਤਰ), ਪੰਜਾਬੀ ਕੋਸ਼ਗਤ ਸ਼ਬਦ ਅਤੇ ਵਿਆਕਰਨਕ ਸ਼ਬਦ

ਭਾਗ-ਦੂਜਾ

ਪੰਜਾਬੀ ਸ਼ਬਦ-ਪ੍ਰਕਾਰ :
(ੳ) ਸੰਯੁਕਤ ਸ਼ਬਦ, ਸਮਾਸੀ ਸ਼ਬਦ, ਦੋਜਾਤੀ ਸ਼ਬਦ, ਦੋਹਰੇ/ਦੁਹਰੁਕਤੀ ਸ਼ਬਦ ਅਤੇ ਮਿਸ਼ਰਤ ਸ਼ਬਦ
(ਅ) ਸਿਖਲਾਈ ਤੇ ਅਭਿਆਸ

ਭਾਗ-ਤੀਜਾ

ਪੰਜਾਬੀ ਸ਼ਬਦ-ਰਚਨਾ :
ਇਕ-ਵਚਨ/ਬਹੁ-ਵਚਨ, ਲਿੰਗ-ਪੁਲਿੰਗ, ਬਹੁਅਰਥਕ ਸ਼ਬਦ, ਸਮਾਨਅਰਥਕ ਸ਼ਬਦ, ਬਹੁਤੇ ਸ਼ਬਦਾਂ ਲਈ ਇਕ ਸ਼ਬਦ, ਸ਼ਬਦ ਜੁੱਟ, ਵਿਰੋਧਅਰਥਕ ਸ਼ਬਦ, ਸਮਨਾਮੀ ਸ਼ਬਦ

ਭਾਗ-ਚੌਥਾ

ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ
ਖਾਣ-ਪੀਣ, ਸਾਕਾਦਾਰੀ, ਰੁੱਤਾਂ, ਮਹੀਨਿਆਂ, ਗਿਣਤੀ, ਮੌਸਮ, ਬਾਜ਼ਾਰ, ਵਪਾਰ, ਧੰਦਿਆਂ ਨਾਲ ਸੰਬੰਧਿਤ

B.Sc. (Computer Science)
SEMESTER-II

BPHC-1204: PUNJAB HISTORY & CULTURE (C 321 TO 1000 A.D.)
(Special Paper in lieu of Punjabi compulsory)
(For those students who are not domicile of Punjab)

Time: 3 Hours **Total. Marks: 50**
Credit Hours (per week):04 **Theory: 37**
Internal Assessment: 13

Instructions for the Paper Setter:

The question paper consists of five units: I, II, III, IV and V. Units I, II, III and IV will have two questions each. Each question carries 8 marks. The students are to attempt one question from each unit approximately in 800 words. Unit-V consists of 7 short answer type questions to be set from the entire syllabus. Students are to attempt any 5 questions in about 20 words each. Each question carries 1 mark.

Note: The examiner is to set the question paper in two languages: English & Hindi.

Course Objectives:

1.	The main objective of this course is to educate the students who are not domicile of the Punjab about the history and culture of the Ancient Punjab.
2.	It is to provide them knowledge about the social, economic, religious, cultural and political life of the peopleof the Punjab during the rule of various dynasties such as The Mauryans, The Khushans, The Guptas, The Vardhanas and other ancient ruling dynasties of the period under study.

UNIT-I

1. Punjab under Chandragupta Maurya and Ashoka.
2. The Kushans and their Contribution to the Punjab.

UNIT-II

3. The Punjab under the Gupta Emperors.
4. The Punjab under the Vardhana Emperors

UNIT-III

5. Political Developments 7th Century to 1000 A.D.
6. Socio-cultural History of Punjab from 7th Century to 1000 A.D.

UNIT-IV

7. Development of languages and Literature.
8. Development of art & Architecture.

Prescribed Books: -

1. **L. Joshi (ed*), History and Culture of the Punjab*, Part-I, Patiala, 1989 (3rd edition)**
2. **L.M. Joshi and Fauja Singh (ed),*History of Punjab*, Vol.I, Patiala 1977.**
3. **BudhaParkash,*Glimpses of Ancient Punjab*, Patiala, 1983. 4. B.N. Sharma, *Life in Northern India*, Delhi. 1966.**

Course Outcomes:

After completion of the course, the students will be able to learn:

CO-1.	The history and culture of the Punjab in Ancient Period.
CO-2.	Social, economic, religious, cultural and political life of Ancient Indian dynasties.
CO-3.	Political developments from 7th century to1000AD.
CO-4.	Socio-cultural history of the Punjab from 7th century to1000AD.
CO-5.	Language, literature, art and architecture of Ancient Punjab.

B.Sc. (Computer Science)
SEMESTER–II
CSC-121: PROGRAMMING USING C
(Theory)

Time: 3 Hours **Total Marks: 100**
Credit Hours (per week):4 **Theory Marks: 56**
Total Hours:60 **Theory Internal Assessment M: 19**
Practical Marks: 19
Practical Internal Assessment M: 06

Note: 1. Medium of Examination is English Language.
2.The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **11 marks**. The total weightage of this section shall be **22 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **11 marks**. The total weightage of this section shall be **22 marks.**

Course Objectives:

1.	The course is designed to provide complete knowledge of C language.
2.	Students will be able to develop logics which will help them to create programs, applications in C.
3.	Also, by learning the basic programming constructs they can easily switch over to any other language in future.

UNIT–I

Data Representation, Introduction to Number Systems and Character Codes, Flow Charts, Problem Analysis, decision tables, pseudo codes and algorithms.

Programming Language C

Basics of C: Introduction to C, Applications and Advantages of C, Tokens, Types of Errors
Data Types: Basic & Derived Data Types, User Defined Data Types, Declaring and initializing variables.
Operators and Expressions: Types of operators (Unary, Binary, Ternary), Precedence and Associativity
Data I/O Functions: Types of I/O function, Formatted & Unformatted console I/O Functions
Control Statements: Jumping, Branching and Looping–Entry controlled and exit controlled, Advantages/Disadvantages of loops, difference between for, while and do–while.

UNIT–II

Arrays: Types of Arrays, One Dimensional and Two-Dimensional Arrays.
Strings: Introduction to Strings and String functions, array of strings.
Functions: User Defined & Library Function, Function (Prototype, Declaration, Definition), Methods of passing arguments, local and global functions, Recursion.

Storage Classes: Introduction to various storage classes, scope and lifetime of a variable, Storage class specifiers (auto, register, static, extern), advantages and disadvantages.
Structure and Union: Introduction to structure and union, pointers with structure
References:

(i) Programming with C Languages C. Schaum Series.
(ii) Yashwant Kanetkar – Let Us C
(iii) C Programming by Stephen G Kochan.

Course Outcomes (Cos):

On Completing the course, the students will be able to:

CO-1.	Use the fundamentals of C programming in trivial problem solving
CO-2.	Identify solution to a problem and apply control structures and user defined functions for solving the problem
CO-3.	Demonstrate the use of Strings and string handling functions
CO-4.	Gain ability to work with arrays of complex objects.
CO-5.	Apply skill of identifying appropriate programming constructs for problem solving

B.Sc. (Computer Science)
SEMESTER–II
(PRACTICAL)

Time: 3 Hours **Practical Marks: 19**
Practical Internal Assessment M: 06

Credit Hours (per week):4

Practical based on Programming in C

B.Sc. (Computer Science)
SEMESTER–II

PHY121A

RELATIVITY AND ELECTROMAGNETISM

(THEORY)

Credit Hours (per week): 3

Time: 3 Hours **Total Hours: 45**

Maximum Marks: 25

Pass Marks: 35%

Note for paper setter and students:

1. **There will be five sections.**
2. **Section A carries 5 marks and is compulsory consisting of seven short answer type questions of 1 marks each covering the whole syllabus. The candidate will have to attempt five questions in section A.**
3. **Sections B, C, D and E will be set from units I, II, III & IV respectively and will consist of two questions of 5 marks each from the respective unit. The candidates are required to attempt one question from each of these sections.**
4. **Scientific calculator is allowed.**

Course Objectives: The aim of course is to discuss the key observations and events that led to the development of Einstein's theory of special relativity and Maxwell's equations of electromagnetism; Explain the fundamental principles of special relativity and electromagnetism and the far-reaching connections between them. Discuss the experimental basis of these fundamental principles and how this contributed to the subsequent development of fundamental physics.

Course Contents:

UNIT–I

Postulates of special theory of relatively. Lorentz transformations, observer and viewer inrelativity. Relativity of simultaneity, Length, Time, velocities. Relativistic Dopper effect.Variation of mass with velocity, mass–energy equivalence, rest mass in an inelastic collision,relativistic momentum & energy, their transformation, concepts of Minkowski space, four vectorformulation.

UNIT–II

Lorentz's force, Definition of Bio-Savart's Law and its application to long straight wire,circular current loop and solenoid. Ampere's Circuital law and its application. Divergence andcurl of B.Hall effect, expression and co–efficient. Vector potential, Definition and derivation,current–density–definition, its use in calculation of charge in magnetic field at a current sheet.E in different frames of reference. Transformation equation of E and B from one frame to another.

UNIT–III

Faraday's Law of EM induction, Displacement current, Mutual inductance and reciprocitytheorem. Self-inductance, L for solenoid, Coupling of Electrical circuits. Analysis of LCR series and parallel resonant, circuits Q–factor, Power consumed, power factor.

UNIT–IV

Maxwell's equations their derivation and characterizations, E.M. waves and wave equation in amedium having finite permeability and permittivity but with conductivity $\sigma=0$. Poynting vector, Impedance of a dielectric to EM waves. EM waves in a conducting medium and Skin depth. EMwave velocity in a conductor and anomalous dispersion. Response of a conducting medium toEM waves. Reflection and transmission of EM waves at a boundary of two dielectric media for normal and oblique incidence.

References:

1. Fundamentals of Vibrations and Waves by S.P. Puri.
2. Physics of Vibrations and Waves by H.J. Pain.
3. EM Waves and Radiating Systems by Edward C. Jordan and K.G. Balmain.
4. Fields and Waves Electromagnetic by David K. Cheng.

Course Learning Outcomes	**On completing the course, the students will be able to:**
CO1	Discuss the key observations and events that led to the development of Einstein's theory of special relativity.
CO2	Explain the fundamental principles of special relativity and electromagnetism and the far-reaching connections between them.
CO3	Describe Maxwell equations and its physical consequences.
CO4	Describe the nature of electromagnetic wave and its propagation through different media and interfaces.
CO5	Discuss the experimental basis of these fundamental principles and how this contributed to the subsequent development of fundamental physics.

B.Sc. (Computer Science)
SEMESTER–II
PHY121B

VIBRATION AND WAVES

(THEORY)

Credit Hours (per week): 3

Time: 3 Hours **Total Hours: 45**

Maximum Marks: 25

Pass Marks: 35%

Note for paper setter and students:

1. **There will be five sections.**
2. **Section A carries 5 marks and is compulsory consisting of seven short answer type questions of 1 marks each covering the whole syllabus. The candidate will have to attempt five questions in section A.**
3. **Sections B, C, D and E will be set from units I, II, III & IV respectively and will consist of two questions of 5 marks each from the respective unit. The candidates are required to attempt one question from each of these sections.**
4. **Scientific calculator is allowed.**

Course Objectives: The purpose of the course is to understand the physical characteristics of SHM and obtaining solution of the oscillator using differential equations, to calculate logarithmic decrement relaxation time and quality factor of a harmonic oscillator. This course provides information to understand the difference between simple harmonic vibrations of same frequencies and different frequencies, wave equation and to understand the significance of transverse waves and longitudinal waves, coupled mechanical as well as electrical oscillators.

Course Contents:

UNIT–I

Simply harmonic motion, energy of a SHO. Compound pendulum. Torsional pendulum Electrical Oscillations, Transverse Vibrations of a mass on string, superposition of two perpendicular SHM of same period and of period in ratio 1:2.

UNIT–II

Decay of free Vibrations due to damping. Differential equation of motion, types of motion, types of damping. Determination of damping co–efficient– Logarithmic decrement, relaxation timeand Q-Factor. Electromagnetic damping (Electrical oscillator).

UNIT–III

Differential equation for forced mechanical and electrical oscillators. Transient and steady state behaviour. Displacement and velocity variation with driving force frequency, variation of phase with frequency, resonance. Power supplied to an oscillator and its variation with frequency.Q-value and band width. Q-value as an amplification factor. Stiffness coupled oscillators,Normal co–ordinates and normal modes of vibration. Inductance coupling of electrical oscillators.

UNIT–IV

Types of waves, wave equation (transverse) and its solution characteristic impedance of a string.Impedance matching. Reflection and Transmission of waves at boundary. Reflection andtransmission of energy. Reflected and transmitted energy coefficients. Standing waves on astring of fixed length. Energy of vibration string. Wave and group velocity.

References:

1. Fundamentals of Vibrations and Waves by S.P. Puri.
2. Physics of Vibrations and Waves by H.J. Pain.
3. EM Waves and Radiating Systems by Edward C. Jordan and K.G. Balmain.
4. Fields and Waves Electromagnetic by David K. Cheng.
5. Waves and Vibrations, T.S. Bhatia, Vishal Publishing Co.
6. Vibrations and Waves, Pardeep Publications Jalandhar

Course Learning Outcomes	**On completing the course, the students will be able to:**
CO1	Understand simple harmonic motion and will be able to solve the equations of motions for physical systems that undergo simple harmonic motion.
CO2	Understand the damped oscillator in the over damped, critically damped and under damped regimes.
CO3	Understand, derive and solve the equations for a forced oscillator, the concept of resonance and variation of displacement and velocity with driving force frequency.
CO4	Understand the concept of coupled oscillators will be able to derive and solve the equation of motion for simple systems and describe the motion of coupled oscillators in terms of normal mode solutions.
CO5	Understand a wave, differences between longitudinal and transverse waves, the concepts of phase and group velocities and be able to calculate these quantities.

B.Sc. (Computer Science)

SEMESTER–II

PHY121P

(PRACTICAL)

Credit Hours (per week): 4.5

Time: 3 Hours **Maximum Marks: 25**

Pass Marks: 35%

General Guidelines for Practical Examination:

I. The distribution of marks is as follows:

i) One experiment: **10 Marks**

ii) Brief Theory:**5 Marks**

iii) Viva–Voce: **5 Marks**

iv) Record (Practical file):**5 Marks**

II. There will be one sessions of 3 hours duration. The paper will have one session. Paper will consist of 8 experiments out of which an examinee will mark 6 experiments andone of these is to be allotted by the external examiner.

III. Number of candidates in a group for practical examination should not exceed 12.

IV. In a single group no experiment be allotted to more than three examinee in any group.

Course Objectives: The Course objective of this subject is to follow the pragmatic way of learning and describe the basic experimental skills in the students. They will be able to demonstrate and able to evaluate the value of acceleration due to gravity g by using Cater's pendulum, Bar pendulum, experimentally and theoretically compare the results of Resonance in a series and parallel LCR circuit. They will also learn about the induced e.m.f. as function of the velocity of the magnet by demonstrating the Faraday's experiment.

Course Contents:

1. To study the magnetic field produced by a current carrying solenoid using a search coil and calculate permeability of air.
2. To study the induced e.m.f. as function of the velocity of the magnet.
3. Study of phase relationships using impedance triangle for LCR circuit and calculate Impedance.
4. Resonance in a series and parallel LCR circuits for different R–value and calculate Q–value.
5. To find the coefficient of self-inductance by Ray Leigh's Method.

6. To measure the charge sensitivity of a moving coil Ballistic galvanometer using a knowncapacitor.
7. To find the angle of dip in the lab using an earth inductor.
8. To find the value of B_H the horizontal component of earth's magnetic field in the labusing a deflection & vibration magnetometer.
9. To study the variation of magnetic field with distance along the axis of coil carryingcurrent by plotting a graph.
10. Measure time period as a function of distance of centre of suspension (oscillation) from centre of mass, plot relevant graphs, determine radius of gyration and acceleration due togravity.
11. Melde's experiment.
12. Find the value of g by Caterer's pendulum.
13. To compare the M.I. of solid & hollow sphere of same mass using tensional pendulum.
14. Measure time period of oscillation of a Maxwell needle and determine modulus of rigidity of the material of a given wire.
15. To measure obtain logarithmic decrement, coefficient of damping, relaxation time, andquality factor of a damped simple pendulum.

References:

1. Practical Physics Vol. I, T.S. Bhatia, Gursharan Kaur, Iqbal Singh, Vishal Publications.
2. Practical Physics, C.L. Arora, S. Chand & Co.

Course Learning Outcomes	**On completing the course, the students will be able to:**
CO1	Study the induced e.m.f. as function of the velocity of the magnet.
CO2	Compare the results of Resonance in a series and parallel LCR circuits for different R–value and calculate Q–value experimentally as well as theoretically.
CO3	Plot the graph of variation of magnetic field with distance along the axis of current carrying coil carrying.
CO4	Verify the laws of vibrating strings and compare the mass per unit length of string using Melde's experiment.
CO5	Find the value of acceleration due to gravity (g) by Kater's pendulum.

B.Sc. (Computer Science)
SEMESTER–II

MAT121A: CALCULUS AND DIFFERENTIAL EQUATION

Medium: English

Time: 3 Hours **Max. Marks: 50**

Credit Hours(per week):4 **Theory Marks: 38**

Total Hours:60 **Internal Assessment: 12**

Instructions for the Paper Setters:

1. The question paper will consist of five sections namely Section-A which will be from entire syllabus (equally distributed from each unit), Section–B, C, D & E from UNIT-I, II, III& IV respectively.
2. The Section–A will consist of eight compulsory questions, each of one mark.
3. The Section–B, C, D & E will consist of two questions each. Students are to attempt any five questions in total by selecting at least one question from each section. Each question carries 6 marks.
4. Teaching time for this paper would be six periods per week.

COURSE OBJECTIVES:

1. Calculus is a branch of mathematics focused on limits, functions, derivatives, integrals, and infinite series.
2. This subject constitutes a major part of contemporary mathematics education. Calculus has widespread applications in science, economics, and engineering and can solve many problems for which algebra alone is insufficient.
3. A differential equation is a mathematical equation that relates some function with its derivatives.
4. In applications, the functions generally represent physical quantities, the derivatives represent their rates of change, and the differential equation defines a relationship between the two Differential equations have applications in fields of engineering, physics, economics, and biology.

UNIT-I

Asymptotes, Tests for concavity and convexity, Points of inflexion, Multiple Points, Curvature, Tracing of Curves (Cartesian and Parametric coordinates only).

UNIT-II

Integration of hyperbolic functions. Reduction formulae. Definite integrals. Fundamental theorem of integral calculus. Quadrature, rectification.

UNIT-III

Exact differential equations. First order and higher degree equations solvable for x,y,p. Clairaut's Form and singular solutions. Geometrical meaning of a differential equation. Orthogonal Trajectories.

UNIT-IV

Linear differential equations with constant and variable coefficients. Variation of Parameters method, reduction method, series solutions of differential equations. Power series Method, Bessel and Legendre equations (only series solution).

References:

1. D.A. Murray: Introductory Course in Differential Equations. Orient Longman (India), 1967.
2. G.F. Simmons: Differential Equations, Tata McGraw Hill, 1972.
3. E.A. Codington: An Introduction to Ordinary Differential Equations, Prentice Hall of India, 1961.
4. Gorakh Prasad: Integral Calculus, Pothishala Pvt. Ltd., Allahabad.
5. Erwin Kreyszig: Advanced Engineering Mathematics, John Wiley and Sons, 1999.
6. Shanti Narayan and P.K. Mittal: Integral Calculus, S Chand & Company

Course Outcomes (COs):

CO-1.	Acquaint themselves with the limits, functions, derivatives, integrals, and infinite series.
CO-2.	Associate Differential equations with the Mathematical modeling.
CO-3.	Solve multifarious differential equations that relate functions with its derivatives.
CO-4.	Know about concavity and convexity of the functions, Asymptotes and multiple points of a curve.
CO-5.	Have knowledge about applications in fields of engineering, physics, economics, and biology.

B.Sc. (Computer Science)
SEMESTER–II

MAT 121B: CALCULUS

Medium: English

Credit Hours(per week):4 **Max. Marks: 50**

Total Hours:60 **Theory Marks: 37**

Time: 3 Hours **Internal Assessment: 13**

Instructions for the Paper Setters:

1. The question paper will consist of five sections namely Section-A, which will be from entire syllabus (equally distributed from each unit), Section–B, C, D & E from UNIT-I, II, III & IV respectively.
2. The Section–A will consist of seven compulsory questions, each of one mark.
3. The Section–B, C, D & E will consist of two questions each. Students are to attempt any five questions in total by selecting at least one question from each section. Each question carries 6 marks.
4. Teaching time for this paper would be six periods per week.

COURSE OBJECTIVES:

1.	This course introduces the concept of partial derivatives which are used in fields such as computer graphics, physical sciences, vector calculus and engineering.
2.	Evaluate double and triple integrals of functions of several variables. Apply them in evaluating area and volume of solids.
3.	This course covers the concepts of jacobians, maxima and minima of functions of two variables, envelopes and evolutes.

UNIT-I

Limit and Continuity of functions of two variables, Partial differentiation, Change of variables, Partial derivatives and differentiability of real–valued functions of two variables, Schwartz's and Young's Theorem, Statements of Inverse and implicit function theorems and applications.

UNIT-II

Euler's theorem on homogeneous functions, Taylor's theorem for functions of two variables, Jacobians, Envelopes. Evolutes, Maxima, Minima and saddle points of functions of two Variables.

UNIT-III

Lagrange's undetermined multiplier method. Double and Triple Integrals, change of variables, Change of order of integration in double integrals.

UNIT-IV

Applications to evaluation of Areas, Volumes, Surfaces of solid of revolution.

References:

1. Narayan, S. & Mittal, P.K. : Integral Calculus, S. Chand & Co.
2. Kreyszig, E.: Advanced Engineering Mathematics.
3. Narayan S. & Mittal, P.K. : Differential Calculus, S. Chand & Co.

Course Outcomes (COs):

On completing the course, the students will be able to:

CO-1.	Apply Calculus in various fields such as computer graphics, physical sciences, economics and engineering.
CO-2.	Use Calculus in oceanography to calculate the height of tides in oceans.
CO-3.	Understand the concept of partial derivatives which are used in fields such as computer graphics, physical sciences, vector calculus and engineering.
CO-4.	Learn about evaluating double and triple integrals of functions of several variables and apply them in evaluating area and volume of solids.
CO-5.	Understand the concepts of jacobians, maxima and minima of functions of two variables, envelopes and evolutes.

B.Sc. (Computer Science)

SEMESTER–II

Course Code: ZDA121
Course Title-DRUG ABUSE: PROBLEM, MANAGEMENT AND PREVENTION
DRUG ABUSE: MANAGEMENT AND PREVENTION
(Compulsory for all Under Graduate Classes)

Credit Hours (per week): 1.5 hrs.
Total Hours: 22.5 hrs.
Max. Marks: 50

Instructions for the Paper Setters:

Section–A: (15 Marks): It will consist of five short answer type questions. Candidates will be required to attempt three questions, each question carrying 05 marks. Answer to any of the questions should not exceed two pages.
Section–B: (20 Marks) It will consist of four essay type questions. Candidates will be required to attempt two questions, each question carrying 10 marks. Answer to any of the questions should not exceed four pages.
Section–C: (15 Marks) It will consist of two questions. Candidate will be required to attempt one question only. Answer to the question should not exceed 5 pages.

Course Objectives:

The course aim is to

CO-1.	Describe the role of family in the prevention of drug abuse.
CO-2.	Describe the role of school and teachers in the prevention of drug abuse.
CO-3.	Emphasize the role of media and educational and awareness program.
CO-4.	Provide knowhow about various legislation and Acts against drug abuse.

UNIT-I

- **Prevention of Drug abuse**

  Role of family: Parent child relationship, Family support, Supervision, Shaping values, Active scrutiny.

UNIT-II

- **School:** Counseling, Teacher as role-model, Parent-Teacher-Health Professional Coordination, Random testing on students.

UNIT-III

- **Controlling Drug Abuse**

  Media: Restraint on advertisements of drugs, advertisements on bad effects of drugs, Publicity and media, Campaigns against drug abuse, Educational and Awareness Program

UNIT-IV

- **Legislation:** NDPS Act, Statutory warnings, Policing of Borders, Checking Supply/Smuggling of Drugs, Strict enforcement of laws, Time bound trials.

References:

1. Extent, Pattern and Trend of Drug Use in India, Ministry of Social Justice and Empowerment, Government of India, 2004.
2. Gandotra, R. and Randhawa, J.K. 2018. ਡਰੱਗਜ਼ ਦੁਰਵਰਤੋਂ (ਨਸ਼ਾਖੋਰੀ) ਪ੍ਰਬੰਧਨ ਅਤ ਰੋਕਥਾਮ। Kasturi Lal & Sons, Educational Publishers, Amritsar- Jalandhar.
3. Inciardi, J.A. 1981. The Drug Crime Connection. Beverly Hills: Sage Publications.
4. Modi, Ishwar and Modi, Shalini (1997) Drugs: Addiction and Prevention, Jaipur: Rawat Publication.
5. Randhawa, J.K. and Randhawa, Samreet 2018. Drug Abuse-Management and Prevention. Kasturi Lal & Sons, Educational Publishers, Amritsar- Jalandhar.
6. Sain, Bhim 1991, Drug Addiction Alcoholism, Smoking obscenity New Delhi: Mittal Publications.
7. Sandhu, Ranvinder Singh, 2009, Drug Addiction in Punjab: A Sociological Study. Amritsar: Guru Nanak Dev University.
8. Singh, Chandra Paul 2000. Alcohol and Dependence among Industrial Workers: Delhi: Shipra. 9. World Drug Report 2011, United Nations office of Drug and Crime.
10. World Drug Report 2010, United Nations office of Drug and Crime

Course Outcomes:

The students will be able to:

CO-1.	Understand the importance of family and its role in drug abuse prevention.
CO-2.	Understand the role of support system especially in schools and inter-relationships between students, parents and teachers.
CO-3.	Understand impact of media on substance abuse prevention.
CO-4.	Understand the role of awareness drives, campaigns etc. in drug abuse management.
CO-5	Learn about the Legislations and Acts governing drug trafficking and Abuse in India.

B.Sc. (Computer Science)

Semester – III

Sr. No.	Course Code	Course Name		Marks				Page No.
				Theory	Practical	Internal Assessment	Total	
1	BENC-2305	ENGLISH (COMPULSORY)		37	-	13	50	316-317
2	BPBI-2301/BPBI-2302/BPHC-2304	Punjabi/Basic Punjabi (Mudhli Punjabi) (Compulsory)/ Punjab History & Culture		37		13	50	318-321
3	CSC-231	COMPUTER SCIENCE (Computer Oriented Numerical and Statistical Methods)		56	19	19Theory 06 Practical	100	322-324
4	PHY231A	Physics	QUANTUM MECHANICS	25	-	25	100	325-331
	PHY231B		OPTICS AND LASERS	25	-			
	PHY231P		Practical		25			
5	MAT-231A	Mathematics	Analysis	38	-	12	50	332-335
	MAT-231B		Analytical Geometry	37		12	50	
6	ESL–221	ENVIRONMENTAL STUDIES–I		-	-	-	50	336-338

B.Sc. (Computer Science)
Semester – III
BENC-2305: ENGLISH (COMPULSORY)

Time: 3 Hours **Max. Marks: 50**
Theory: 37
Credit Hours (per week):4 **Internal Assessment: 13**
Total Hours:60Course Objectives:

1. To enhance language proficiency by providing adequate exposure to reading and writing skills.
2. The prescribed course equips students with nuances of language that includes proficiency in grammar, its effective usage in speaking and writing.
3. It also develops their personality.
4. It further helps them to prepare for various competitive exams and to keep up with the increasing demand of English in Indian society.

Text books Prescribed & Course Contents:
1. *Making Connections* by Kenneth J. Pakenham 3rd Edn. CUP
2. *Moments in Time:* An Anthology of Poems, G.N.D.U. Amritsar
3 *Murphy's English Grammar 4th Edition (*by Raymond Murphy*) CUP*
Course Contents:

I. *Making Connections*: Unit -I & Unit- II
II. *Moments in Time:* Poems at serial No.1-6
III. Unit 121-136 from *Murphy's English Grammar*

Instructions for the Paper Setter and Distribution of Marks:
The question paper will consist of three sections and distribution of marks will be as under:
Section A: 08 Marks
Section B: 20 Marks
Section C: 09 Marks

Section–A

1. **Twelve (12)** Questions on the usage of grammar related to the prescribed units of *Murphy's English Grammar* will be set for the students to attempt **any Eight(8)** (1 X 8= 8Marks)

Section–B

1. **TWO** questions (with sub parts) based on strategies & skill development exercises as given before and after reading essays in UNIT-I & UNIT-II of the prescribed text book *Making Connections* will be set. The number of items in each question will be 50% more than what a student will be expected to attempt so that the question provides internal choice**.** (7X2= 14 Marks)

2. **THREE** questions on central idea, theme, tone & style etc. of three poems from the prescribed textbook, *Moments in Time* will be set. The students are required to attempt any TWO of these questions. (3X2= 6Marks)

Section–C

1. **One** question (with internal choice) requiring students to explain a stanza with reference to context will be set. The stanzas for explanation will be taken from the poems prescribed in the syllabus. **(**1X4= 4Marks)
2. The students are required to write a **report** in about 200-250 words on a topic related to college activities. (1X5= 5 Marks)

Course Outcomes:

After passing this course, the students will be able to:

CO-1.	Develop an understanding of the poems taught, relate to the socio-cultural background of England and be able to answer questions regarding tone, style and central idea
CO-2.	Comprehend the basics of grammatical rules governing prepositions in detail
CO-3.	Enhance their reading and analyzing power of texts through guided reading
CO-4.	Enrich their vocabulary and use new words in their spoken and written language
CO-5.	Develop skills to write a report on a given topic.

B.Sc. (Computer Science)
BPBI-2301
ਲਾਜ਼ਮੀ ਪੰਜਾਬੀ

ਸਮਾਂ : 3 ਘੰਟੇ | ਕ੍ਰੈਡਿਟ ਪ੍ਰਤੀ ਹਫਤਾ : 04
ਕੁੱਲ ਘੰਟੇ : 60 | ਥਿਊਰੀ ਅੰਕ : 37, ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ : 13, ਕੁੱਲ ਅੰਕ : 50

ਅੰਕ-ਵੰਡ ਅਤੇ ਪ੍ਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

- ਸਿਲੇਬਸ ਦੇ ਚਾਰ ਭਾਗ ਹਨ ਪਰ ਪ੍ਰਸ਼ਨ-ਪੱਤਰ ਦੇ ਪੰਜ ਭਾਗ ਹੋਣਗੇ। ਪਹਿਲੇ ਚਾਰ ਭਾਗਾਂ ਵਿਚ 02-02 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰੇਕ ਭਾਗ ਵਿਚੋਂ 01-01 ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਲਾਜ਼ਮੀ ਹੋਵੇਗਾ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ (08) ਅੰਕ ਹੋਣਗੇ। ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਪੰਜਵੇਂ ਭਾਗ ਵਿਚ ਸਾਰੇ ਸਿਲੇਬਸ ਵਿਚੋਂ 01-01 ਅੰਕ ਦੇ ਛੇ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ, ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ 05 ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ ਦੇਣਾ ਲਾਜ਼ਮੀ ਹੋਵੇਗਾ। ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ-ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।
  ਨੋਟ: ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ 13 ਅੰਕਾਂ ਦੀ ਹੈ, ਜੋ ਕਾਲਜ ਵੱਲੋਂ ਨਿਰਧਾਰਿਤ ਦਿਸ਼ਾ ਨਿਰਦੇਸ਼ਾਂ ਅਨੁਸਾਰ ਥਿਊਰੀ ਅੰਕਾਂ ਤੋਂ ਵੱਖਰੀ ਹੋਵੇਗੀ। ਇਸ ਪੇਪਰ ਦੇ ਕੁੱਲ ਅੰਕ 37+13 = 50 ਹਨ।

ਕੋਰਸ ਦਾ audyS Course Objective

- ਵਿਦਿਆਰਥੀ ਅੰਦਰ ਸਾਹਿਤਕ ਰੁਚੀਆਂ ਦਾ ਨਿਰਮਾਣ ਕਰਨਾ।
- ਵਿਦਿਆਰਥੀ ਦੀ ਸਾਹਿਤਕ ਸਮਝ ਨੂੰ ਹੋਰ ਵਧਾਉਣਾ।
- ਭਾਸ਼ਾਈ ਗਿਆਨ ਵਿਚ ਵਾਧਾ ਕਰਨਾ।

ਪਾਠ-ਕ੍ਰਮ ਨਤੀਜੇ Course Outcomes (COs)

- ਵਿਦਿਆਰਥੀ ਦੀ ਸਾਹਿਤਕ ਸੋਚ-ਸਮਝ ਹੋਰ ਪਕੇਰੀ ਹੋਵੇਗੀ।
- ਵਿਦਿਆਰਥੀ ਅੰਦਰ ਸਾਹਿਤ ਰੁਚੀਆਂ ਵੱਧਣਗੀਆ।
- ਵਿਦਿਆਰਥੀ ਅੰਦਰ ਸਾਹਿਤ ਨਿਰਮਾਣ ਦੀਆਂ ਸੰਭਾਵਨਾਵਾਂ ਵੱਧਣਗੀਆਂ।
- ਵਿਦਿਆਰਥੀ ਅੰਦਰ ਸੰਬੰਧਿਤ ਵਿਸ਼ੇ ਦਾ ਗਹਿਨ ਅਧਿਐਨ ਦੀ ਕਾਬਲੀਅਤ ਨਿਖਰੇਗੀ।
- ਵਿਦਿਆਰਥੀ ਅੰਦਰ ਭਾਸ਼ਾਈ ਸੰਰਚਨਾ ਬਾਰੇ ਸਮਝ ਵਧੇਗੀ।

ਪਾਠ-ਕ੍ਰਮ

ਭਾਗ-ਪਹਿਲਾ

ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਵਾਰਤਕ
ਡਾ. ਗੁਰਬਚਨ ਸਿੰਘ ਤਾਲਿਬ (ਸੰਪਾ.), ਪੰਜਾਬੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।
(ਲੇਖ 1 ਤੋਂ 7 ਲੇਖ ਦਾ ਵਿਸ਼ਾ-ਵਸਤੂ/ਸਾਰ/ਕਲਾ ਪੱਖ)

ਭਾਗ-ਦੂਜਾ

ਚੋਣਵੇਂ ਪੰਜਾਬੀ ਇਕਾਂਗੀ
ਡਾ. ਰਮਿੰਦਰ ਕੌਰ (ਸੰਪਾ.), ਕਸਤੂਰੀ ਲਾਲ ਐਂਡ ਸੰਨਜ਼, ਅੰਮ੍ਰਿਤਸਰ।
(ਇਕਾਂਗੀਆਂ 'ਸੁਹਾਗ', 'ਨਵਾਂ ਚਾਨਣ', 'ਅੰਨੇ ਨਿਸ਼ਾਨਚੀ', 'ਅਰਮਾਨ', 'ਚਾਬੀਆਂ', 'ਮਿੱਟੀ ਦਾ ਬਾਵਾ' ਅਤੇ 'ਸੱਧਰਾਂ')
(ਇਕਾਂਗੀ ਦਾ ਸਾਰ/ਵਿਸ਼ਾ-ਵਸਤੂ/ਪਾਤਰ ਚਿਤਰਨ)

ਭਾਗ-ਤੀਜਾ

(ੳ) ਸੰਖੇਪ ਰਚਨਾ (ਪ੍ਰੈਸੀ)
(ਅ) ਦਿੱਤੇ ਪੈਰ੍ਹੇ ਵਿਚੋਂ ਅਸ਼ੁੱਧ ਸ਼ਬਦ ਜੋੜਾਂ ਨੂੰ ਸ਼ੁੱਧ ਕਰਨਾ

ਭਾਗ-ਚੌਥਾ

ਮੂਲ ਵਿਆਕਰਨਕ ਇਕਾਈਆਂ : ਪਰਿਭਾਸ਼ਾ ਅਤੇ ਵੰਨਗੀਆਂ (ਭਾਵੰਸ਼, ਸ਼ਬਦ, ਵਾਕੰਸ਼, ਉਪਵਾਕ ਅਤੇ ਵਾਕ)

B.Sc. (Computer Science)
Semester – III
BPBI-2302
ਮੁਢਲੀ ਪੰਜਾਬੀ
(In Lieu of Compulsory Punjabi)

ਸਮਾਂ : 3 ਘੰਟੇ ਕ੍ਰੈਡਿਟ ਪ੍ਰਤੀ ਹਫਤਾ : 04
ਕੁੱਲ ਘੰਟੇ : 60 ਥਿਊਰੀ ਅੰਕ : 37, ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ : 13, ਕੁੱਲ ਅੰਕ : 50

ਅੰਕ-ਵੰਡ ਅਤੇ ਪ੍ਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

- ਪਹਿਲੇ ਭਾਗ ਵਿਚੋਂ ਸ਼ਬਦ-ਸ਼੍ਰੇਣੀਆਂ ਦੀ ਪਛਾਣ ਅਤੇ ਵਰਤੋਂ ਨਾਲ ਸੰਬੰਧਿਤ ਚਾਰ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਚਾਰ-ਚਾਰ ਅੰਕਾਂ ਦੇ ਤਿੰਨ ਵਰਣਨਾਤਮਕ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਲਾਜ਼ਮੀ ਹਨ। ਪੰਜਾਬੀ ਵਾਕ ਬਣਤਰ ਵਾਲੇ ਭਾਗ ਵਿਚੋਂ ਪੰਜ ਪ੍ਰਸ਼ਨ ਦੋ-ਦੋ ਅੰਕਾਂ ਦੇ ਪੁੱਛੇ ਜਾਣਗੇ। ਸਾਰੇ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਲਾਜ਼ਮੀ ਹਨ। ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਇਕ ਪੈਰ੍ਹਾ ਦਿੱਤਾ ਜਾਵੇਗਾ ਅਤੇ ਉਸ ਉੱਪਰ ਆਧਾਰਿਤ ਇਕ-ਇਕ ਅੰਕ ਦੇ ਪੰਜ ਪ੍ਰਸ਼ਨ ਦਿੱਤੇ ਜਾਣਗੇ। ਉੱਤਰ 50 ਸ਼ਬਦਾਂ ਤੱਕ ਸੀਮਿਤ ਹੋਵੇਗਾ। ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਅੱਠ ਅਖਾਣ ਅਤੇ ਮੁਹਾਵਰੇ ਦਿੱਤੇ ਜਾਣਗੇ ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਪੰਜ ਨੂੰ ਵਾਕਾਂ ਵਿਚ ਵਰਤ ਕੇ ਅਰਥ ਸਪੱਸ਼ਟ ਕਰਨੇ ਹੋਣਗੇ। ਹਰ ਅਖਾਣ ਅਤੇ ਮੁਹਾਵਰੇ ਦਾ ਇਕ-ਇਕ ਅੰਕ ਹੋਵੇਗਾ। ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਇਕ ਵਾਰਤਾਲਾਪ ਜਾਂ ਵਾਰਤਕ ਦਾ ਟੋਟਾ ਦਿੱਤਾ ਜਾਵੇਗਾ ਜਿਸ ਨੂੰ ਉਸ ਨੇ ਵਾਰਤਕ ਜਾਂ ਵਾਰਤਾਲਾਪ ਵਿਚ ਤਬਦੀਲ ਕਰਕੇ ਲਿਖਣਾ ਹੋਵੇਗਾ।

ਨੋਟ: ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ 13 ਅੰਕਾਂ ਦੀ ਹੈ, ਜੋ ਕਾਲਜ ਵੱਲੋਂ ਨਿਰਧਾਰਿਤ ਦਿਸ਼ਾ ਨਿਰਦੇਸ਼ਾਂ ਅਨੁਸਾਰ ਥਿਊਰੀ ਅੰਕਾਂ ਤੋਂ ਵੱਖਰੀ ਹੋਵੇਗੀ। ਇਸ ਪੇਪਰ ਦੇ ਕੁਲ ਅੰਕ 37+13 = 50 ਹਨ।

ਕੋਰਸ ਦਾ ਉਦੇਸ਼ Course Objective

- ਵਿਦਿਆਰਥੀ ਨੂੰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਤੇ ਵਾਕ ਬਣਤਰ ਤੋਂ ਜਾਣੂ ਕਰਾਉਣਾ।
- ਵਿਦਿਆਰਥੀ ਦੇ ਭਾਸ਼ਾਈ ਗਿਆਨ ਨੂੰ ਵਧਾਉਣਾ।
- ਅਖਾਣ-ਮੁਹਾਵਰਿਆਂ ਤੇ ਪ੍ਰਤੀਕੋਡਨ ਰਾਹੀਂ ਭਾਸ਼ਾਈ ਸਮਰੱਥਾ ਨੂੰ ਵਧਾਉਣਾ।

ਪਾਠ-ਕ੍ਰਮ ਨਤੀਜੇ Course Outcomes (COs)

- ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੀ ਸਮਝ ਹੋਰ ਵਿਕਸਿਤ ਹੋਵੇਗੀ।
- ਉਨ੍ਹਾਂ ਦੀ ਭਾਸ਼ਾਈ ਬਾਰੀਕੀਆਂ ਨੂੰ ਸਮਝਣ ਦੀ ਕਾਬਲੀਅਤ ਵਿਚ ਵਾਧਾ ਹੋਵੇਗਾ।
- ਉਨ੍ਹਾਂ ਵਿਦਿਆਰਥੀ ਦੀ ਲਿਖਤ ਵਿਚ ਨਿਖਾਰ ਆਵੇਗਾ।
- ਅਖਾਣ-ਮੁਹਾਵਰਿਆਂ ਦੀ ਵਰਤੋਂ ਰਾਹੀਂ ਉਹ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੇ ਨਾਲ-ਨਾਲ ਪੰਜਾਬੀ ਸਭਿਆਚਾਰ ਨਾਲ ਵੀ ਜੁੜਨਗੇ।

ਭਾਗ-ਪਹਿਲਾ

ਪੰਜਾਬੀ ਸ਼ਬਦ-ਸ਼੍ਰੇਣੀਆਂ ਦੀ ਪਛਾਣ ਅਤੇ ਵਰਤੋਂ :
ਨਾਂਵ, ਪੜਨਾਂਵ, ਵਿਸ਼ੇਸ਼ਣ, ਕਿਰਿਆ, ਕਿਰਿਆ-ਵਿਸ਼ੇਸ਼ਣ, ਸੰਬੰਧਕ,ਯੋਜਕ, ਵਿਸਮਿਕ

ਭਾਗ-ਦੂਜਾ

ਪੰਜਾਬੀ ਵਾਕ-ਬਣਤਰ : ਕਰਤਾ, ਕਰਮ, ਕਿਰਿਆ, ਪੰਜਾਬੀ ਵਾਕਾਂ ਵਿਚ ਤੱਤਾਂ ਦੀ ਤਰਤੀਬ, ਸਾਧਾਰਨ ਵਾਕ, ਬਿਆਨੀਆ ਵਾਕ, ਪ੍ਰਸ਼ਨਵਾਚਕ ਵਾਕ, ਹੁਕਮੀ ਵਾਕ, ਸੰਯੁਕਤ ਅਤੇ ਮਿਸ਼ਰਤ ਵਾਕ

ਭਾਗ-ਤੀਜਾ

ਪ੍ਰਕਾਰਜੀ ਪੰਜਾਬੀ-ੀ : ਪੈਰ੍ਹਾ ਆਧਾਰਿਤ ਪ੍ਰਸ਼ਨ

ਭਾਗ-ਚੌਥਾ

ਪ੍ਰਕਾਰਜੀ ਪੰਜਾਬੀ-ੀ :
(ੳ) ਅਖਾਣ ਤੇ ਮੁਹਾਵਰੇ
(ਅ) ਪ੍ਰਤੀਕੋਡਨ (ਠਰਓਨਸਚੋਦਨਿਗ)

B.Sc. (Computer Science)
Semester – III
BPHC-2304: PUNJAB HISTORY & CULTURE (AD.1000-1606)
(Special Paper in lieu of Punjabi compulsory)
(For those students who are not domicile of Punjab)

Time: 3 Hours **Total. Marks: 50**
Theory: 37
Internal Assessment: 13

Instructions for the Paper Setter:
The question paper consists of five units: I, II, III, IV and V. Units I, II, III and IV will have two questions each. Each question carries 8 marks. The students are to attempt one question from each unit approximately in 800 words. Unit-V consists of 7 short answer type questions to be set from the entire syllabus. Students are to attempt any 5 questions in about 20 words each. Each question carries 1 mark.
Note: The examiner is to set the question paper in two languages: English & Hindi.

Course Objectives:

1.	The main objective of this course is to introduce the students who are not domicile of the Punjab about the history and culture of the Punjabduring Turko-Afghan and the Mughal rule in Punjab during 1000- 1606 A.D.
2.	The curriculum is to acquaint pupils with philosophy and teachings of the Bhakti saints, Sufis and the Sikh Gurus.
3.	It also aims to provide information regarding the foundation and consolidation of the Sikhism under the firstfive Sikh Gurus.

UNIT-I

1. Society and culture of the Punjab during Turko-Afghan rule.
2. The Punjab under the Mughals.

UNIT-II

3. Bhakti Movement and its impact on Society of the Punjab.
4. Sufism in the Punjab with special reference to Baba Farid.

UNIT-III

5. Guru Nanak Dev – Life and Travels.
6. Teachings of Guru Nanak, Concept of Sangat, Pangat, and Dharmsal.

UNIT-IV

7. Contribution of Guru AngadDev, Guru Amardas and Guru Ramdas.
8. Compilation of AdiGranth and martyrdom of Guru Arjun Dev.

References:-

1. P.N.Chopra, B.N.Puri, & M.NDas, *A Social, Cultural & Economic History of India,* Vol. II., Macmillan India,New Delhi, 1974.
2. J.SGrewal,*The Sikhs of the Punjab*, Cambridge University Press, New Delhi,1994.

3. FaujaSingh,*A History of the Sikhs*-Vol. I & II, Punjabi University,Patiala, 1972.
4.KhushwantSingh,*A History of the Sikhs*-Vol. I (1469-1839),Oxford University Press,New Delhi, 2011.
5. KirpalSingh, *History and Culture of the Punjab*-Part II (Medieval Period), PublicationBureau,Punjabi University,Patiala,1990.

COURSE OUTCOMES:

On completing the course, the students will be able to:

CO-1.	understand and apply the concepts of geometry in the daily life.
CO-2.	analyse the applications of geometry in different fields such as art, robotics, Computer, and video games.
CO-3.	realize the important role of Analytical Geometry in architecture and also in the construction of stairs by making use of angles.
CO-4.	comprehend the concepts of change of origin, rotation of axes and invariants for second degree equations in two and three dimensions.
CO-5.	know about the properties of conics (parabola, ellipse, hyperbola and sphere).

B.Sc. (Computer Science)
Semester – III
COMPUTER SCIENCE
CSC-231: Computer Oriented Numerical and Statistical Methods
(Theory)

Time: 3 Hours **Total Marks: 100**
Credit Hours (per week):4 **Theory Marks: 56**
Total Hours:60 **Theory Internal Assessment M: 19**
Practical Marks: 19
Practical Internal Assessment M: 06

Note: 1. Medium of Examination is English Language.
2.The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **11 marks**. The total weightage of this section shall be **22 marks.**

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **11 marks**. The total weightage of this section shall be **22 marks**.

Course Objectives:

At the end of the course, the students will be able to:	
1.	To understand and implement various concepts of numerical and statistical methods to solve real life problems.
2.	To develop the mathematical skills of the students in the areas of numerical methods.
3.	To provide conceptual understanding of various numerical methods like solution of non-linear equations, system of linear equations, interpolation, numerical differentiation and integration with an aim of helping the students to understand the fundamentals, concepts and practical use of these methods in the field of computer sciences and applications.
4.	To provide understanding of statistical problems like testing of assumptions.

UNIT-I

Introduction

1 Numerical methods, Numerical methods versus numerical analysis, Errors and Measures of errors.

2 Non-linear Equations, Iterative Solutions, Multiple roots and other difficulties, Interpolation methods, Methods of bisection, False position Method, Newton Raphson-method.

3 Simultaneous Solution of Equations, Gauss Elimination Method, Gauss Jordan method. Gauss Siedel Method, Matrix Inversion Method.

4 Interpolation and Curve Fitting, Lagrangian Polynomials, Newton Methods: Forward

Difference Method, Backward Difference Method Divided Difference Method.

5 Numerical Integration and Different Trapezoidal Rule, Simpson's 1/3 Rule Simpson's 3/8 Rule.

UNIT II

Numerical differentiation by Polynomial Fit Statistical Techniques

1 Measure of Central Tendency, Preparing frequency distribution table, Mean Arithmetic, Mean geometric, Mean harmonic, Mean median Mode.

2 Measure of dispersion, Skewness and Kurtosis Range, Mean deviation, Standard deviation, Co-efficient of variation, Moments Skewness Kurtosis.

1. Correlation Bivariate Distribution Multivariate distribution.

2. Regression B.C., Linear Regression, Multiple Regression .

3. Trend Analysis least square fit linear trend, Non-linear trend

$Y=ax^{b}$

$Y=ab^{x}$

$Y=ae^{bx}$

Polynomial fit: $Y= a+bx+cx^{2}$

References:

1 B.S. Grewal: *Numerical Methods for Engineering,* Sultan Chand Publications.
2 V. Rajaraman: *Computer Oriented Numerical Methods,* Prentice Hall of India Private Ltd.,.

Course Outcomes:

On completion of this course students will able to:	
CO-1.	Demonstrate understanding of common numerical methods and how they are used to obtain approximate solutions
CO-2.	Apply various numerical methods to find our solution of algebraic and transcendental non-linear equations and also solve system of linear equations numerically using direct and iterative methods.
CO-3.	Understand the methods to construct interpolating polynomials and finite difference concepts (forward, backward, divided, and central difference) for prediction and also find integration to find area under curve.
CO-4.	Learn fundamentals concepts of statistical and optimization methods.
CO-5.	Understand frequency distribution and measures of central tendency(like mean, median and mode), measures of dispersion(range, mean deviation ,standard deviation), correlation, and curve fit, skewness, and Kurtosis.

B.Sc. (Computer Science)
Semester – III

Practical Marks: 19
Credit Hours (per week):04 **Practical Internal Assessment M: 06**

COMPUTER SCIENCE
Computer Oriented Numerical and Statistical Methods Lab.

Practical based on Computer Oriented Numerical and Statistical Methods.

B.Sc. (Computer Science)
Semester – III
PHY231A

QUANTUM MECHANICS

(THEORY)

Credit Hours (per week): 3

Time: 3 Hours **Total Hours: 45**

Maximum Marks: 25

Pass Marks: 35%

Note for paper setter and students:

1. **There will be five sections.**
2. **Section A carries 5 marks and is compulsory consisting of seven short answer type questions of 1 marks each covering the whole syllabus. The candidate will have to attempt five questions in section A.**
3. **Sections B, C, D and E will be set from units I, II, III & IV respectively and will consist of two questions of 5 marks each from the respective unit. The candidates are required to attempt one question from each of these sections.**
4. **Scientific calculator is allowed.**

Course Objectives: The main objective of this course is to make students aware about the basic formulations in quantum mechanics. To acquire mathematical skills require to develop theory of quantum mechanics. To develop understanding of postulates of quantum mechanics and to learn to apply them tosolve some quantum mechanical systems.To offer systematic methodology for the application of Schrodinger equation to solve quantum mechanical systems. There are many different types of representations of state and operators that are very useful in studying the subject deeply. It teaches about various commutation and uncertainty relations. Students will be given insight to solve Schrodinger wave equation in three dimensions.

Course Contents:

UNIT–I

Formalism of Wave Mechanics:

Brief introduction to need and development of quantum mechanics, photoelectric effect, Compton effect, Wave particle duality, De broglie hypothesis, Uncertainity principle, Guassian wave packet. Operator correspondence. Normalization and probability interpretation of wave function. Superposition principle.

UNIT–II

Expectation value, Probability current and conservation of probability. Admissibility conditions or wave function. Ehrenfest theorem, Eigen function and eigen value. Operator formalism, orthogonal system, expansion in eigen functions, Hermitian operator, simultaneous eigen function, equation of motion.

UNIT–III

Application of Schrodinger wave equation to one dimensional problems: Fundamental postulates of wave mechanics, Schrodinger's wave equation for a free particle and equation of a particle subject to forces. One dimensional step potential for E>V0 , one dimensional step potential for 0<E<V0, one dimensional potential barrier of finite height and width, Quantum mechanical tunnelling effect, particle in one dimensional box with infinitely hard walls, one dimensional square well of finite depth

UNIT–IV

Application of Schrodinger equation to three dimensional problems: Free particle in three dimensional rectangular box, Eigen wave function, Eigen values of momentum, energy and degeneracy, three dimensional harmonic oscillator (Cartesian coordinates) wave function, energy levels,degeneracy, Schrodinger's wave equation in spherical polar co-ordinates, Schrodinger wave equation for spherically symmetric potential for hydrogen atom, wave function of H atom, solution of $R(r),\Theta(\theta),\Phi(\phi)$ equations.

References:

1. A Text book of Quantum Mechanics, P.M. Mathews and K. Venkatesan,
(Tata McGraw Hill Pub., Co., Delhi) 2002.
2. Quantum Mechanics J.L. Powell and B. Craseman (Narosa Pub. House, New Delhi) 1997.
3. Concepts of Modern Physics, Arthur Beiser (McGraw Hill Pub. Co., New Delhi, 9th Ed.)
1995.
4. Elements of Modern Physics, S.H. Patil (McGraw Hill), 1998.
5. Quantum Mechanics, E. Merzbacher (John Wiley, 2nd Edition)
6. Fundamentals of Molecular Spectroscopy, C.N. Banwell (Tata McGraw Hill Pub. Co.,
Delhi), 2001.
7. Atomic Spectra, H.G. Kuhn (Longmans), 2nd Ed., 1969.
8. Introduction to Quantum Mechanics, L. Pauling and E.B. Wilson (Tata McGraw Hill Pub.
Co., Delhi), 2002.
9. Quantum Mechanics, W. Greiner (Springer Verlag), 1994.

Course Learning Outcomes	**On completing the course, the students will be able to:**
CO1	Learn the basic formulation of Quantum mechanics developed by de Broglie and Schrodinger.
CO2	Understand to various operators and Schrodinger equation.
CO3	Understand detailed quantum mechanical analysis of few one dimensional potential systems.
CO4	Learn the detailed quantum mechanical analysis of few three dimensional potential systems.
CO5	Analyze Hydrogen atom and Harmonic oscillator.

B.Sc. (Computer Science)
Semester – III
PHYSICS

PHY231B

OPTICS AND LASERS

(THEORY)

Credit Hours (per week): 3

Time: 3 Hours **Total Hours: 45**

Maximum Marks: 25

Pass Marks: 35%

Note for paper setter and students:

1. **There will be five sections.**
2. **Section A carries 5 marks and is compulsory consisting of seven short answer type questions of 1 marks eachcovering the whole syllabus. The candidate will have to attempt five questions in section A.**
3. **Sections B, C, D and E will be set from units I, II, III & IV respectively and will consist of two questions of 5 marks each from the respective unit. The candidates are required to attempt one question from each of these sections.**
4. **Scientific calculator is allowed.**

Course Objectives: Learnt the natural phenomenon of wave nature of light and its experimental proof and Understand the effect of interference of light during reflection, transmission and Michelson interferometer, diffraction and polarization of light and their types, laser physics with its applications in different fields, stimulated and spontaneous emission studied by Einstein equations.

Course Contents:

UNIT–I

Interference of Light:

Superposition of light waves and interference, young's double slit experiment, Conditions for sustained interference pattern, Coherent sources of light, Interference pattern by division of wave front, Fresnel Biprism, Displacement of fringes, Change of phase on reflection, Interference in thin films due to reflected and transmitted light, non reflecting films, Newton's Rings. Michelson Interferometer.

UNIT–II

Diffraction:

Huygen'sfresnel theory, half-period zones, Zone plate, Distinction between fresnel and fraunhoffer diffraction. Fraunhoffer diffraction at rectangular and circular apertures, Effect of diffraction in

optical imaging, Resolving power of telescope in diffraction grating, its use as a spectroscopic element and its resolving power, Resolving power of microscope.

UNIT–III

Polarization:

Plane Polarized light, Elliptically polarized light, wire grid polarizer, Sheet polarizer, Mauls' Law, Brewester Law, Polarization by reflection, Scattering, Double reflection, Nicol prism, Retardation plates, Production Analysis of polarized light, Quarter and half wave plates.

UNIT–IV

Laser Fundamentals:

Derivation of Einstein relations, Concept of stimulated emission and population inversion, broadening of spectral lines (Qualitative), three level and four level laser schemes, elementary theory of optical cavity, Longitudinal and transverse modes.Components of laser devices, condition for laser action, types of lasers, Ruby and Nd:YAG lasers, He-Ne and CO2 lasers construction, modeof creating population inversion and output characteristics, application of lasers –a general outline.

References:

1. Fundamentals of Optics, F.A. Jenkins and Harvey E White,(Mcgraw Hill) 4th edition,2001
2. Optics, AjoyGhatak,(McMillan Indian) 2nd edition, 7th reprint, 1997
3. Introduction to Atomic Spectra, H.E. White (Mcgraw Hill, Book Co., Inc., New York)
4. Laser Fundamentals, W.T. Silfvast (Foundation Books), New Delhi, 1996
5. Laser and Non-Liner Optics, B.B. Laud (New Age Pub.) 2002
6. Optics, Born and Wolf, (Pergamon Press) 3rd edition, 1965
7. Laser, Svelto, (Plenum Pres) 3rd edition, New York

Course Learning Outcomes	**On completing the course, the students will be able to:**
CO1	Learn the natural phenomenon of wave nature of light and its experimental proof.
CO2	Understand the effect of interference of light during reflection, transmission and Michelson interferometer.
CO3	Understand the concepts and complete explanation of diffraction and polarization of light and their types.
CO4	Explain the basic theories of laser physics with its applications in different fields.
CO5	Explain the stimulated and spontaneous emission studied by Einstein equations.

B.Sc. (Computer Science)
SEMESTER–III

PHY231P

(PRACTICAL)

Credit Hours (per week): 4.5

Time: 3 Hours **Maximum Marks: 25**

Pass Marks: 35%

General Guidelines for Practical Examination:

I. The distribution of marks is as follows: **25 Marks**

i) One experiment:**10 Marks**

ii) Brief Theory:**5 Marks**

iii) Viva–Voce:**5 Marks**

iv) Record (Practical file):**5 Marks**

II. There will be one sessions of 3 hours duration. The paper will have one session.

Paper will consist of 8 experiments out of which an examinee will mark 6 experiments and

one of these is to be allotted by the external examiner.

III. Number of candidates in a group for practical examination should not exceed 12.

IV. In a single group no experiment be allotted to more than three examinee in any group.

Course Objectives: Main objective of this course is to acquire the appropriate data accurately form spectrometer measurements, sextant, laser diffraction, polarimeterand keep systematic record of laboratory activities. Interpret findings using the correct physical scientific framework and tools.Prepare professional quality textual and graphical presentations of laboratory data and spectral results.Evaluate possible causes of discrepancy in practical experimental observations, results incomparison to theory.

Course Contents:

1. To determine refractive index of glass and liquid using spectrometer.
2. To determine the Cauchy's constants.
3. To study the refractive index of a doubly refracting prism.
4. To set up Newton's rings to determine wavelength of sodium light.
5. To determine the wavelength by using plane diffraction grating (Use Hg source)
6. To determine dispersive power of plane diffraction grating.
7. To determine resolving power of a telescope.
8. To determine resolving power of a grating.
9. To measure an accessible (Horizontal and vertical) height using sextant.

10. To measure inaccessible height by using sextant.
11. To study the rotation of plane of polarization by using polarimeter.
12. Determination of wavelength of He-Ne laser using single slit /N slit diffraction pattern.

References:

1. Practical Physics Vol. II, T.S. Bhatia, Gursharan Kaur, Iqbal Singh, Vishal Publications.
2. Practical Physics, C.L. Arora, S. Chand & Co.

Course Learning Outcomes	**On completing the course, the students will be able to:**
CO1	Use the spectrometer to study various spectra.
CO2	Understand the concept of sextant to measure accessible and inaccessible lengths.
CO3	Verify the law of probability distribution using coins.
CO4	Explain Diffraction through grating using He-Ne laser and sodium light.
CO5	Understand the concept of polarimeter.

B.Sc. (Computer Science)
SEMESTER–III

MAT-231A ANALYSIS

Medium: English
Credit Hours(per week):4 **Max. Marks: 50**
Total Hours:60 **Theory Marks: 38**
Time: 3 Hours **Internal Assessment: 12**

Instructions for the Paper Setters:

1. The question paper will consist of five sections namely Section-A, which will be from entire syllabus (equally distributed from each unit), Section–B, C, D & E from UNIT-I, II, III & IV respectively.
2. The Section–A will consist of eight compulsory questions, each of one mark.
3. The Section–B, C, D & E will consist of two questions each. Students are to attempt any five questions in total by selecting at least one question from each section. Each question carries 6 marks.
4. Teaching time for this paper would be six periods per week.

COURSE OBJECTIVES:

CO-1.	Analysis is the branch of mathematics that studies the behavior of real numbers, sequences and series of real numbers and real functions.
CO-2.	The content of this course is designed to make the students understand to work comfortably with completeness of real line, to test the convergence of sequences and series of various types and the convergence of improper integrals.
CO-3.	The content of this course helps to solve Riemann integrability, the use of beta and gamma functions in solving various problems of calculus.

UNIT-I

Definition of a sequence. Theorems on limits of sequences. Bounded and monotonic sequences. Cauchy's convergence criterion.

UNIT-II

Series of non-negative terms. Comparison tests. Cauchy's integral tests. Ratio tests. Cauchy's root test. Raabe's test, Logarithmic test. Demorgan's and Bertrand's tests. Kummer's test, Cauchy Condensation test, Gauss test, Alternating series. Leibnitz's test, absolute and conditional convergence.

UNIT-III

Partitions, Upper and lower sums. Upper and lower integrals, Riemann integrability. Conditions of existence of Riemann integrability of continuous functions and of monotone functions. Algebra of integrable functions.

UNIT-IV

Improper integrals and statements of their conditions of existence. Test of the convergence of improper integral, beta and gamma functions.

References:

1. Malik, S.C & Arora, Savita.: Mathematical Analysis, Wiley Eastern Ltd. (1991).
2. Apostal, T.M.: Mathematical Analysis, Addison Wesley Series in Mathematics (1974).

3. Narayan, S & Mittal, P.K.: Integral Calculus, S. Chand & Co.

Course Outcomes:

On completing the course, the students will be able to:

CO-1.	Study the behaviour of real numbers, sequences and series of real numbers.
CO-2.	Test the convergence of sequences and series of various types, the convergence of improper integrals.
CO-3.	Apply the concept of Riemann integrability, the use of beta and gamma functions in solving various problems of calculus.

B.Sc. (Computer Science)
SEMESTER–III

MAT-231B: ANALYTICAL GEOMETRY

Medium: English
Credit Hours(per week):4 **Max. Marks: 50**
Total Hours:60 **Theory Marks: 37**
Time: 3 Hour **Internal Assessment: 13**

Instructions for the Paper Setters:

1. The question paper will consist of five sections namely Section-A, which will be from entire syllabus (equally distributed from each unit), Section–B, C, D & E from UNIT-I, II, III & IV respectively.
2. The Section–A will consist of seven compulsory questions, each of one mark.
3. The Section–B, C, D & E will consist of two questions each. Students are to attempt any five questions in total by selecting at least one question from each section. Each question carries 6 marks.
4. Teaching time for this paper would be six periods per week.

COURSE OBJECTIVES:

1.	Analytic geometry is a branch of mathematics that enable the students in understanding and applying the concepts of geometry in the daily life.
2.	Some of such applications of geometry in different fields are art, robotics, Computer, and video games, architecture, Astronomy and physics, geographic information systems, and also in the construction of stairs making the use of angles of geometry.
3.	Helps to understand the concepts of change of origin, rotation of axes and invariants for second degree equations in two and three dimensions.
4.	The properties of conics (parabola, ellipse, hyperbola and sphere) are also to be studied.

UNIT-I

Transformation of axes in two and three dimensions: Shifting of origin, Rotation of axes, The invariants, Joint equation of pair of straight lines, equations of bisectors.

UNIT-II

Parabola and its properties. Tangents and normals, Pole and polar, pair of tangents at a point, Chord of contact, equation of the chord in terms of mid point and diameter of conic.

UNIT-III

Ellipse and hyperbola with their properties. Tangents and normals, Pole and polar. Pair of tangents at a point, Chord of contact.

UNIT-IV

Intersection of three planes, condition for three planes to intersect in a point or along a line or to form a prism. Identifications of curves represented by second degree equation (including pair of lines). Sphere, Section of a sphere by a plane, spheres of a given circle. Intersection of a line and a sphere. Tangent line, tangent plane, power of a point w.r.t. a sphere, radical planes.

References:

1. Gorakh Prasad and H.C. Gupta: Text Book on Coordinate Geometry.
2. S.L. Loney: The Elements of Coordinate Geometry, Macmillan and Company, London.
3. Narayan, S. & Mittal, P.K.: Analytical Solid Geometry, S. Chand & Co.
4. Kreyszig, E.: Advanced Engineering Mathematics, John Wiley & Sons.
5. Thomos, G.B. and Finney, R.L.: Calculus and Analytic Geometry.

Course Outcomes:
On completing the course, the students will be able to:

CO-1.	Understand and apply the concepts of geometry in the daily life.
CO-2.	Analyse the applications of geometry in different fields such as art, robotics, Computer, and video games.
CO-3.	Realize the important role of Analytical Geometry in architecture and also in the construction of stairs by making use of angles.
CO-4.	Comprehend the concepts of change of origin, rotation of axes and invariants for second degree equations in two and three dimensions.
CO-5.	Know about the properties of conics (parabola, ellipse, hyperbola and sphere).

B.Sc. (Computer Science)
SEMESTER–III
Course code: ESL–221
Course Title: ENVIRONMENTAL STUDIES–I (COMPULSORY)

Credit Hours (Per Week): 2
Total Hours: 30
Maximum Marks: 50 Marks

Instructions for Paper Setters: The question paper will consist of three sections. Candidate will be required to attempt all the sections. Each unit of the syllabus should be given equal weightage of marks. Paper to be set in English, Punjabi and Hindi.

Section–A: (16 Marks): It will consist of five short answer type questions. Candidates will be required to attempt four questions, each question carrying four marks. Answer to any of the questions should not exceed two pages.

Section–B: (24 Marks): It will consist of five questions. Candidates will be required to attempt four questions, each question carrying six marks. Answer to any of the questions should not exceed four pages.

Section–C: (10 Marks): It will consist of two questions. Candidate will be required to attempt one question (carrying ten marks) only. Answer to the question should not exceed 5 pages.

Course Objectives

CO-1	The main goal of Environmental studies is to create the environmental awareness to create a safe, green and sustainable environment.
CO-2	To make students aware about the importance of ecosystem, types of ecosystem, energy flow in an ecosystem, ecological succession, food chain and food web.
CO-3	To make students aware of water conservation, global warming, consumerism and waste products. and, also about the environmental protection acts.
CO-4	Role of National Service Scheme (NSS). Health and hygiene.

UNIT-I

The Multidisciplinary Nature of Environmental Studies:

- Definition, scope & its importance.
- Need for public awareness.

Natural Resources:

- Natural resources and associated problems:

a) Forest Resources: Use of over exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.

b) Water Resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.

c) Mineral Resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

d) Food Resources: World food problems, change caused by agriculture and overgrazing, effects or modern agriculture, fertilizer-pesticide problem, salinity, case studies.

e) Energy Resources: Growing of energy needs, renewable and non-renewable energy resources, use of alternate energy sources, case studies.

iii) **f) Land Resources**: Land as a resource, land degradation, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

UNIT-II

Ecosystem:

- Concept of an ecosystem.
- Structure and function of an ecosystem.
- Producers, consumers and decomposers.
- Energy flow in the ecosystem.
- Ecological succession.
- Food chains, food webs and ecological pyramids.

Introduction, types, characteristic features, structure and function of the following ecosystems:

a. Forest ecosystem

b. Grassland ecosystem

c. Desert ecosystem

d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

UNIT-III

Social Issues and Environment:

From unsustainable to sustainable development.

Urban problems related to energy.

Water conservation, rain water harvesting, watershed management.

Resettlement and rehabilitation of people; its problems and concerns. Case studies.

Environmental ethics: Issues and possible solutions.

Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocause. Case studies.

Wasteland reclamation.

Consumerism and waste products.

Environmental Protection Act:

- Air (prevention and Control of Pollution) Act.
- Water (prevention and Control of Pollution) Act.
- Wildlife Protection Act.
- Forest Conservation Act.

Issues involved in enforcement of environmental legislation.

Public awareness.

UNIT-IV

National Service Scheme

- **Introduction and Basic Concepts of NSS:** History, philosophy, aims & objectives of NSS; Emblem, flag, motto, song, badge etc.; Organizational structure, roles and responsibilities of various NSS functionaries.
- **Health, Hygiene & Sanitation:** Definition, needs and scope of health education; Food and Nutrition; Safe drinking water, water borne diseases and sanitation (Swachh Bharat Abhiyan); National Health Programme; Reproductive health.

References/Books:

1. Agarwal, K. C. 2001. Environmental Biology, Nidhi Publications Ltd. Bikaner.
2. Bharucha, E. 2005. Textbook of Environmental Studies, Universities Press, Hyderabad.
3. Down to Earth, Centre for Science and Environment, New Delhi.
4. Jadhav, H. & Bhosale, V. M. 1995. Environmental Protection and Laws. Himalaya Pub.
5. Joseph, K. and Nagendran, R. 2004. Essentials of Environmental Studies, Pearson Education (Singapore) Pte. Ltd., Delhi.
6. Kaushik, A. & Kaushik, C. P. 2004. Perspective in Environmental Studies, New Age International (P) Ltd, New Delhi.
7. Miller, T. G. Jr. 2000. Environmental Science, Wadsworth Publishing Co.
8. Sharma, P. D. 2005. Ecology and Environment, Rastogi Publications, Meerut.
9. Booklet on Safe Driving. Sukhmani Society (Suvidha Centre), District Court Complex, Amritsar
10. Kanta, S., 2012. Essentials of Environmental Studies, ABS Publications, Jalandhar.

Course Outcomes

CO-1	To learn about the sustainable environment.
CO-2	To gain the knowledge ecosystem and its functioning.
CO-3	To know about the water conservation programs like rain water harvesting and water shedding. and, to gain knowledge of environmental (air, water and pollution) protections acts.
CO-4	To know about the role and importance of NSS– a volunteer organization, in making up a better environment and to maintain better health and hygiene.

B.Sc. (Computer Science)
Semester – IV

Sr. No.	Course Code	Course Name		Marks				Page No.
				Theory	Practical	Internal Assessment	Total	
1	BENC-2405	ENGLISH (COMPULSORY)		37	-	13	50	340-341
2	BPBI-2401/BPBI-2402/BPHC-2404	Punjabi/Basic Punjabi (Mudhli Punjabi) (Compulsory)/ Punjab History & Culture		37		13	50	342-345
3	CSC-241	COMPUTER SCIENCE (Data Structures & Programming Language Using C++)		56	19	19Theory 06 Practical	100	346-348
4	PHY241A	Physics	STATISTICAL PHYSICS &THERMODYNAMICS	25	-	25	100	349-354
	PHY241B		ATOMIC AND MOLECULAR SPECTRA	25	-			
	PHY241P		Practical		25			
5	MAT-241A	Mathematics	STATICS AND VECTOR CALCULUS	38	-	12	50	355-358
	M-241B		SOLID GEOMETRY	37		13	50	
6	ESL–222		ENVIRONMENTAL STUDIES–II	-	-	-	50	359-362

B.Sc. (Computer Science)
Semester – IV
ENGLISH (COMPULSORY)

Time: 3 Hours **Max. Marks : 50**
Credit Hours (per week):4 **Theory : 37**
Total Hours:60 **Internal Assessment : 13**

Instructions for the Paper Setter and Distribution of Marks:
The question paper will consist of three sections and distribution of marks will be as under:
Section A: 08 Marks
Section B: 20 Marks
Section C: 09 Marks

Section–A: Twelve (12) Questions on usage of grammar related to the prescribed units of *Murphy's English Grammar* will be set for the students to attempt **any Eight(8)**(1X8= 8 Marks)
Section–B: TWO questions (with sub parts) based on strategies & skill development exercises as given before and after reading essays in Unit-III & Unit-IV of the prescribed text book *Making Connections* will be set. The number of items in each question will be 50% more than what a student will be expected to attempt so that the question provides internal choice. (7X2=14 Marks)**.**

1.THREE questions on central idea, theme, tone & style etc. of three poems from the prescribed textbook, *Moments in Time* will be set. The students are required to attempt any TWO of these questions. (3X2 = 6 Marks) .
Section–C: One question (with internal choice) requiring students to explain a stanza with reference to context will be set. The stanzas for explanation will be taken from the poems prescribed in the syllabus. (1X4 =4 Marks)
1.ONE question based on 'Beyond the Reading' section at the end of each chapter of the prescribed textbook, *Making Connections* will be set. (1X5 = 5 Marks)

Course Objectives:

1.	To acquaint students with the characteristics of various literary genres.
2.	To develop analytical skills and critical thinking through close reading of literary texts.
3.	To cultivate appreciation of language as an artistic medium and to help them understand the importance of forms, elements and style that shape literary works.
4.	To enable students to understand that literature is an expression of human values within a historical and social context.

Course Contents:

I. *Making Connections*: Unit –III & Unit- IV
II. *Moments in Time*: poems at serial No.7-12
III. Unit 98-112 from *Murphy's English Grammar*.

References:

1. *Making Connections* by Kenneth J. Pakenham 3rd Edn. CUP
2. *Moments in Time:* An Anthology of Poems, G.N.D.U. Amritsar
3 *Murphy's English Grammar 4th Edition (*by Raymond Murphy*)* CUP

Course Outcomes:

After passing this course, the students will be able to:

CO-1.	Develop an understanding of the poems taught and be able to answer questions regarding situations, themes and characters depicted in them.
CO-2.	Comprehend the basics of grammatical rules governing adjectives, adverbs, conjunctions and prepositions.
CO-3.	Enhance their reading and analyzing power of texts through guided reading.
CO-4.	Enrich their vocabulary and use newly learnt words in both spoken and written language.
CO-5.	Develop skills to write an essay on a given topic.

B.Sc. (Computer Science)
Semester – IV
BPBI-2401
ਲਾਜ਼ਮੀ ਪੰਜਾਬੀ

ਸਮਾਂ : 3 ਘੰਟੇ ਕ੍ਰੈਡਿਟ ਪ੍ਰਤੀ ਹਫਤਾ : 04
ਕੁੱਲ ਘੰਟੇ : 60 ਥਿਊਰੀ ਅੰਕ : 37, ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ : 13, ਕੁੱਲ ਅੰਕ : 50

ਅੰਕ-ਵੰਡ ਅਤੇ ਪ੍ਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

- ਸਿਲੇਬਸ ਦੇ ਚਾਰ ਭਾਗ ਹਨ ਪਰ ਪ੍ਰਸ਼ਨ-ਪੱਤਰ ਦੇ ਪੰਜ ਭਾਗ ਹੋਣਗੇ। ਪਹਿਲੇ ਚਾਰ ਭਾਗਾਂ ਵਿਚ 02-02 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰੇਕ ਭਾਗ ਵਿਚੋਂ 01-01 ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਲਾਜ਼ਮੀ ਹੋਵੇਗਾ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ (08) ਅੰਕ ਹੋਣਗੇ। ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਪੰਜਵੇਂ ਭਾਗ ਵਿਚ ਸਾਰੇ ਸਿਲੇਬਸ ਵਿਚੋਂ 01-01 ਅੰਕ ਦੇ ਛੇ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ, ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ 05 ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ ਦੇਣਾ ਲਾਜ਼ਮੀ ਹੋਵੇਗਾ। ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ-ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।
ਨੋਟ: ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ 13 ਅੰਕਾਂ ਦੀ ਹੈ, ਜੋ ਕਾਲਜ ਵੱਲੋਂ ਨਿਰਧਾਰਿਤ ਦਿਸ਼ਾ ਨਿਰਦੇਸ਼ਾਂ ਅਨੁਸਾਰ ਥਿਊਰੀ ਅੰਕਾਂ ਤੋਂ ਵੱਖਰੀ ਹੋਵੇਗੀ। ਇਸ ਪੇਪਰ ਦੇ ਕੁੱਲ ਅੰਕ 37+13 = 50 ਹਨ।

ਕੋਰਸ ਦਾ ਉਦੇਸ਼ Course Objective

- ਵਿਦਿਆਰਥੀ ਦੀ ਸਾਹਿਤਕ ਸਮਝ ਨੂੰ ਪਕੇਰਾ ਕਰਨਾ।
- ਵਿਦਿਆਰਥੀ ਦੀਆਂ ਸਾਹਿਤਕ ਰੁਚੀਆਂ ਨੂੰ ਉਭਾਰਨਾ।
- ਭਾਸ਼ਾਈ ਸਮਝ ਨੂੰ ਵਿਕਸਤ ਕਰਨਾ।

ਪਾਠ-ਕ੍ਰਮ ਨਤੀਜੇ Course Outcomes (COs)

- ਵਿਦਿਆਰਥੀ ਦੀ ਵਾਰਤਕ ਵਿਚ ਦਿਲਚਸਪੀ ਵਧੇਗੀ।
- ਵਿਦਿਆਰਥੀ ਦੀ ਵਾਰਤਕ ਵਿਧਾ ਸੰਬੰਧੀ ਸਮਝ ਵਿਕਸਤ ਹੋਵੇਗੀ।
- ਵਿਦਿਆਰਥੀ ਅੰਦਰ ਸ਼ੁੱਧ ਪੰਜਾਬੀ ਲਿਖਣ ਦੀ ਕਲਾ ਵਿਕਸਤ ਹੋਵੇਗੀ।
- ਵਿਦਿਆਰਥੀ ਅੰਦਰ ਲੇਖ ਰਚਨਾ ਤੇ ਇਸ਼ਤਿਹਾਰ ਲਿਖਣ ਦੀ ਕਲਾ ਨਿਖਰੇਗੀ।
- ਵਿਦਿਆਰਥੀ ਗੁਰਮੁਖੀ ਲਿਪੀ ਦੀਆਂ ਵਿਸ਼ੇਸਤਾਵਾਂ ਤੋਂ ਜਾਣੂ ਹੋਣਗੇ।

ਪਾਠ-ਕ੍ਰਮ

ਭਾਗ-ਪਹਿਲਾ

ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਵਾਰਤਕ
ਡਾ. ਗੁਰਬਚਨ ਸਿੰਘ ਤਾਲਿਬ (ਸੰਪਾ.), ਪੰਜਾਬੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।
(ਲੇਖ 8 ਤੋਂ 14 ਲੇਖ ਵਿਚੋਂ ਵਿਸ਼ਾ-ਵਸਤੂ/ਸਾਰ/ਕਲਾ ਪੱਖ)

ਭਾਗ-ਦੂਜਾ

ਫ਼ਾਸਲੇ
ਜਤਿੰਦਰ ਬਰਾੜ, ਨਾਨਕ ਸਿੰਘ ਪੁਸਤਕਮਾਲਾ, ਅੰਮ੍ਰਿਤਸਰ।
(ਵਿਸ਼ਾ ਵਸਤੂ/ਸਾਰ/ਨਾਟਕ ਕਲਾ)

ਭਾਗ-ਤੀਜਾ

(ੳ) ਲੇਖ ਰਚਨਾ (ਸਮਾਜਕ, ਸਭਿਆਚਾਰਕ, ਇਤਿਹਾਸਿਕ ਅਤੇ ਵਿਦਿਅਕ ਸਰੋਕਾਰਾਂ ਸੰਬੰਧੀ)
(ਅ) ਅਖ਼ਬਾਰ ਵਿਚ ਇਸ਼ਤਿਹਾਰ

ਭਾਗ-ਚੌਥਾ

ਵਿਆਕਰਨ :
(ੳ) ਸ਼ਬਦ-ਜੋੜਾਂ ਦੇ ਨਿਯਮ
(ਅ) ਗੁਰਮੁਖੀ ਲਿਪੀ ਦੀਆਂ ਵਿਸ਼ੇਸ਼ਤਾਵਾਂ

B.Sc. (Computer Science)
Semester – IV
BPBI-2402
ਮੁਢਲੀ ਪੰਜਾਬੀ
(In Lieu of Compulsory Punjabi)

ਸਮਾਂ : 3 ਘੰਟੇ ਕ੍ਰੈਡਿਟ ਪ੍ਰਤੀ ਹਫਤਾ : 04
ਕੁੱਲ ਘੰਟੇ : 60 ਥਿਊਰੀ ਅੰਕ : 37, ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ : 13, ਕੁੱਲ ਅੰਕ : 50

ਅੰਕ-ਵੰਡ ਅਤੇ ਪ੍ਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

- ਭਾਗ-ਪਹਿਲਾ ਵਿਚੋਂ ਚਾਰ ਵਰਣਨਾਤਮਕ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਚਾਰ-ਚਾਰ ਅੰਕਾਂ ਦੇ ਤਿੰਨ ਵਰਣਨਾਤਮਕ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਲਾਜ਼ਮੀ ਹਨ। ਭਾਗ-ਦੂਜਾ ਵਿਚੋਂ ਵਿਭਿੰਨ ਸਮਾਜਕ/ਸਭਿਆਚਾਰਕ ਪ੍ਰਸਥਿਤੀਆਂ ਦੇ ਅੰਤਰਗਤ ਪੰਜ ਵਾਕ ਬਣਾਉਣ ਲਈ ਕਿਹਾ ਜਾਵੇਗਾ। ਹਰੇਕ ਵਾਕ ਦੇ ਦੋ ਅੰਕ ਹੋਣਗੇ। ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਤਿੰਨ ਵਿਸ਼ੇ ਦਿੱਤੇ ਜਾਣਗੇ, ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਕਿਸੇ ਇਕ ਵਿਸ਼ੇ ਨਾਲ ਸੰਬੰਧਿਤ ਪੈਰ੍ਹਾ ਰਚਨਾ ਕਰਨੀ ਹੋਵੇਗੀ। ਨਿੱਜੀ, ਦਫ਼ਤਰੀ ਅਤੇ ਵਪਾਰਕ ਚਿੱਠੀ : ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਦੋ ਵਿਚੋਂ ਕਿਸੇ ਇਕ ਵਿਸ਼ੇ 'ਤੇ ਚਿੱਠੀ ਲਿਖਣ ਲਈ ਕਿਹਾ ਜਾਵੇਗਾ। ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਇਕ ਪੈਰ੍ਹਾ ਦਿੱਤਾ ਜਾਵੇਗਾ, ਜਿਸ ਦੀ ਉਸ ਨੇ ਇਕ ਤਿਹਾਈ ਹਿੱਸੇ ਵਿਚ ਸੰਖੇਪ ਰਚਨਾ ਕਰਨੀ ਹੋਵੇਗੀ ਅਤੇ ਢੁੱਕਵਾਂ ਸਿਰਲੇਖ ਦੇਣਾ ਹੋਵੇਗਾ।
  ਨੋਟ: ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ 13 ਅੰਕਾਂ ਦੀ ਹੈ, ਜੋ ਕਾਲਜ ਵੱਲੋਂ ਨਿਰਧਾਰਿਤ ਦਿਸ਼ਾ ਨਿਰਦੇਸ਼ਾਂ ਅਨੁਸਾਰ ਥਿਊਰੀ ਅੰਕਾਂ ਤੋਂ ਵੱਖਰੀ ਹੋਵੇਗੀ। ਇਸ ਪੇਪਰ ਦੇ ਕੁਲ ਅੰਕ 37+13 = 50 ਹਨ।

ਕੋਰਸ ਦਾ ਉਦੇਸ਼ Course Objective

- ਵਿਦਿਆਰਥੀ ਨੂੰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਤੇ ਵਾਕ ਬਣਤਰ ਤੋਂ ਜਾਣੂ ਕਰਾਉਣਾ।
- ਵਿਦਿਆਰਥੀ ਦੇ ਭਾਸ਼ਾਈ ਗਿਆਨ ਨੂੰ ਵਧਾਉਣਾ।
- ਲਿਖਤ ਤੇ ਸੰਚਾਰ ਦੇ ਹੁਨਰ ਨੂੰ ਹੋਰ ਪਰਪੱਕ ਕਰਨਾ।

ਪਾਠ-ਕ੍ਰਮ ਨਤੀਜੇ Course Outcomes (COs)

- ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਵਿਆਕਰਨਕ ਇਕਾਈਆਂ ਦੀ ਪਛਾਣ ਤੇ ਵਰਤੋਂ ਰਾਹੀਂ ਭਾਸ਼ਾਈ ਗਿਆਨ ਵਿਕਸਿਤ ਹੋਵੇਗਾ।
- ਉਨ੍ਹਾਂ ਅੰਦਰ ਪੈਰ੍ਹਾ ਰਚਨਾ ਅਤੇ ਸੰਖੇਪ ਰਚਨਾ ਦੀਆਂ ਬਾਰੀਕੀਆਂ ਤੋਂ ਜਾਣੂ ਹੋਵੇਗਾ।
- ਉਨ੍ਹਾਂ ਅੰਦਰ ਚਿੱਠੀ ਪੱਤਰ ਦੀ ਕਲਾ ਦਾ ਵਿਕਾਸ ਹੋਵੇਗਾ।
- ਉਨ੍ਹਾਂ ਅੰਦਰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦਾ ਗਿਆਨ ਤੇ ਹੁਨਰ ਹੋਰ ਪਰਿਪੱਕ ਹੋਵੇਗਾ।

ਪਾਠ-ਕ੍ਰਮ

ਭਾਗ-ਪਹਿਲਾ

ਪੰਜਾਬੀ ਵਿਆਕਰਨਕ ਇਕਾਈਆਂ ਦੀ ਪਛਾਣ ਅਤੇ ਵਰਤੋਂ :

ਮੁਢਲੀ ਜਾਣਕਾਰੀ (ਭਾਵੰਸ਼, ਸ਼ਬਦ, ਵਾਕੰਸ਼, ਉਪਵਾਕ, ਵਾਕ)

ਭਾਗ-ਦੂਜਾ

ਪੰਜਾਬੀ ਵਾਕਾਂ ਦੀ ਵਰਤੋਂ :

ਵਿਭਿੰਨ ਸਮਾਜਕ/ਸਭਿਆਚਾਰਕ ਪ੍ਰਸਥਿਤੀਆਂ ਦੇ ਅੰਤਰਗਤ - ਘਰ, ਬਾਜ਼ਾਰ, ਮੇਲੇ, ਸਿਨਮੇ, ਵਿਆਹ, ਧਾਰਮਿਕ ਸਥਾਨਾਂ ਵਿਚ ਅਤੇ ਦੋਸਤਾਂ ਆਦਿ ਨਾਲ।

ਭਾਗ-ਤੀਜਾ

ਪ੍ਰਕਾਰਜੀ ਪੰਜਾਬੀ-ੀ : ਪੈਰ੍ਹਾ ਰਚਨਾ

ਭਾਗ-ਚੌਥਾ

ਪ੍ਰਕਾਰਜੀ ਪੰਜਾਬੀ-ੀ :

(ੳ) ਚਿੱਠੀ ਪੱਤਰ

(ਅ) ਸੰਖੇਪ ਰਚਨਾ

B.Sc. (Computer Science)
Semester – IV

BPHC-2404: PUNJAB HISTORY & CULTURE (AD.1606-1849)
(Special Paper in lieu of Punjabi compulsory)

(For those students who are not domicile of Punjab)

Time: 3 Hours **Total. Marks: 50**
Credit Hours(per week):4 **Theory: 37**
Total Hours: 60 **Internal Assessment: 13**

Instructions for the Paper Setter:

The question paper consists of five units: I, II, III, IV and V. Units I, II, III and IV will have two questions each. Each question carries 8 marks. The students are to attempt one question from each unit approximately in 800 words. Unit-V consists of 7 short answer type questions to be set from the entire syllabus. Students are to attempt any 5 questions in about 20 words each. Each question carries 1 mark.

Note: The examiner is to set the question paper in two languages: English & Hindi.

Course Objectives:

1.	The main objective of this course is to introduce the students who are not domicile of the Punjab with the history and culture of the Punjab during 1606-1849 A.D.
2.	It aims to provide information regarding the transformation of Sikhism under Guru Hargobind Sahib, martyrdom of Guru Tegh Bahadur, circumstances leading to the creation of KhalsaPanth, Rise of Banda Bahadur and the Punjab under the Sikh Misls.
3.	It also intends to provide information regarding the establishment of the Sikh rule by Ranjit Singh and his administrative system in the Punjab.

UNIT-I

1. Transformation of Sikhism under Guru Hargobind.
2. Martyrdom of Guru Teg Bahadur.

UNIT-II

3. Creation of the Khalsa .
4. The Khalsa and its impact on the Punjab.

UNIT-III

5. Rise of Banda Bahadur and his achievements.
6. Rise of Misls.

UNIT-IV

7. Ranjit Singh's rise to power; Civil, Military and Land Revenue Administration.
8. Art ,Architecture, Folk Music, Fair and Festivals in the Punjab during the medieval period.

References:-

1. P.N. Chopra, B.N. Puri, & M.N Das, A Social, Cultural & Economic History of India-Vol. II., Macmillan India, New Delhi, 1974.
2. J.S Grewal, The Sikhs of the Punjab, Cambridge University Press, New Delhi, 1994.
3. Fauja Singh,A History of the Sikhs-Vol. I & II, Punjabi University, Patiala, 1972.
4. Kushwant Singh, A History of the Sikhs-Vol. I (1469-1839),Oxford University Press, New Delhi, 2011.
5. Kirpal Singh, History and Culture of the Punjab-Part II (Medieval Period), Publication Bureau, Punjabi University, Patiala, 1990.

COURSE OUTCOMES:

On completing the course, the students will be able to:

CO-1.	understand the study of system of forces in equilibrium and differentiation and integration of vector functions.
CO-2.	define the resolution and composition of a number of forces, parallel forces and couples, moments of forces and couples about a point and a line.
CO-3.	generalise the theory behind the friction and centre of gravity.
CO-4.	memorize definition of directional derivative and gradient and illustrate geometric meanings with the aid of sketches.

B.Sc. (Computer Science)
Semester – IV

COMPUTER SCIENCE
CSC-241: Data Structures & Programming Language Using C++
(Theory)

Time: 3 Hours **Total Marks: 100**
Credit Hours(per week):4 **Theory Marks: 56**
Total Hours:60 **Theory Internal Assessment Marks: 19**
Practical Marks: 19
Practical Internal Assessment Marks: 06

Note: 1. Medium of Examination is English Language.
2.The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks**.
Course Objectives:

Objectives of the course is to:

1	Provide the knowledge of basic data strucutres and their implementation.
2	Understand the importance of data structure in contest of writing effiecent programms.
3	Implement stack,queue,linked list ,tree and graph data structures.

UNIT I

Data Structure: Introduction to elementary Data Organization, Common Operation on Data Structures, Algorithm Complexity, Big O Notation, Time-Space Trade-off between Algorithm.
Arrays: Array Defined, Representing Arrays in memory, Various operations on Linear arrays, Multi-Dimensional arrays.
Object Oriented Programming: objects & classes, constructor & destructor, operator overloading, overloading unary operators, overloading binary operators, data conversion, Pitfalls of operator overloading and conversion, Inheritance, Derived class and base, Derived class constructor. Overloading member functions, Inheritance in the English distance class, class hierarchies, Public & Private inheritance, Level of inheritance, Polymorphism, problems with single inheritance, multiple inheritance.

UNIT II

Linked Lists: Types of Linked Lists, representing linked list in memory, advantages of using linked lists over arrays, Various operations of linked lists.

Stacks: Description of STACK structure, Implementation of stack, using arrays and linked lists, application of stack-converting Arithmetic expression from infix notational to polish and their subsequent evaluation, quicksort technique to sort an array.

Queues: Description of queue structure, Implementation of queue using arrays and linked lists, description or priorities of queues, deques.

Sorting and Searching: Sorting Algorithms, bubble sort, selection sort, insertion sort, quick sort, merge sort, heap sort, searching Algorithms, linear search and binary search.

References:

1. Seymour Lischutz, *Theory and Problems of Data Structures.*
2. *Schaum's Outline Serie*s, McGraw Hill Company.
3. Tanenbaum, *Data Structure*

Course Outcome:

On Completing the course, the students will be able to:

CO-1.	Learn the basic types of data structures their implementation and application.
CO-2.	Use linear and non-linear data structure like stacks, queues, linked list etc.
CO-3.	Implement various searching and sorting algorithms
CO-4.	Handle operations like searching, insertion, deletion, traversing mechanism etc. on various data structures.
CO-5.	Develop programming skills

B.Sc. (Computer Science)
Semester – IV
COMPUTER SCIENCE
(Practical)

Credit Hours (per week)4 **Practical Marks: 19**
Total Hours: 60 **Practical Internal Assessment Marks: 06**

Practical based on Data Structures & Programming Language Using C++

B.Sc. (Computer Science)
Semester – IV
PHYSICS

PHY241A

STATISTICAL PHYSICS & THERMODYNAMICS

(THEORY)

Credit Hours (per week): 3

Time: 3 Hours **Total Hours: 45**

Maximum Marks: 25

Pass Marks: 35%

Note for paper setter and students:

1. **There will be five sections.**
2. **Section A carries 5 marks and is compulsory consisting of seven short answer type questions of 1 marks each covering the whole syllabus. The candidate will have to attempt five questions in section A.**
3. **Sections B, C, D and E will be set from units I, II, III & IV respectively and will consist of two questions of 5 marks each from the respective unit. The candidates are required to attempt one question from each of these sections.**
4. **Scientific calculator is allowed.**

Course Objectives: This course provides an introduction to the basic idea of statistical physics, from which emerges an understanding of the microstate, macrostate, particle distribution in static and dynamic systems. It includes the detailed theory of classical and quantum statistics of various physical systems. Students will be able to link the statistical aspect of entropy and thermodynamical probability. It gives an insight into the derivation of various thermodynamical relations and their applications

Course Contents:

UNIT–I

Basic ideas of Statistical Physics, Scope of Statistical Physics, Basic ideas about probability, Distribution of four distinguishable particles into compartments of equal size. Concept of macrostates, microstates, Thermodynamic Probability, Effects of constraints on the system. Distribution of n particles in two compartments. Deviation from the state of maximum probability. Equilibrium state of dynamic system. Distribution of distinguishable n particles in k

Compartments of unequal sizes.

UNIT–II

Phase space and division into elementary cells. Three kinds of statistics. The basic approach in three statistics. Maxwell Boltzmann (MB) statistics applied to an ideal gas in equilibrium. Experimental verification of law of distribution of molecular speeds. Need for Quantum Statistics – B.E. Statement

of Planck's law of Radiation Wien's Displacement and Stefan's law. Fermi Dirac (FD) statistics. Comparison of M.B, B.E and F.D statistics.

UNIT–III

Statistical definition of entropy, Change of entropy of system, additive nature of entropy, Law of increase of entropy, Reversible and irreversible processes, and their examples, work done in reversible process, examples of increase in entropy in natural processes, entropy and disorder, Brief review of Terms, Laws of Thermodynamics, Carnot Cycle, Entropy changes in carnot cycle, Applications of thermodynamics to thermoelectric effect, change of entropy along reversible path in P-V diagram. Heat death of universe.

UNIT–IV

Derivation of Maxwell Thermodynamics relations, Cooling produced by adiabatic stretching, Adiabatic Compression, change of internal energy with volume, Specific heat and constant pressure and constant volume. Expression for C_P-C_v, Change of state and Claypron equation.

References:

1. Statistical Physics and Thermodynamics, V.S. Bhatia, T. S. Bhatia, (Vishal Publications, Jalandhar).

2. A Treatise on Heat, M.N. Saha&b.N. Srivastava (The Indian Press Pvt. Ltd., Allhabad),1965.

3. Statistical Mechanics: An Introductory Text, Bhattacharjee, J.K. (Allied Pub., Delhi), 2000.

4. Statistical Physics, Bhattacharjee, J.K. (Allied Pub., Delhi) 2000.

5. Statistical Mechanics, B.B. Laud, (Macmillan India Ltd.) 1981.

Course Learning Outcomes	**On completing the course, the students will be able to:**
CO1	Understand the concept of thermo dynamical probability and energy wise distribution of particles in various compartments
CO2	Learn the concept of phase space, classical and quantum statistics.
CO3	Analyze the statistical concept of entropy.
CO4	Analyze the application of thermodynamics, heat death of universe.
CO5	Derive and understand application of Maxwell thermodynamical relations.

B.Sc. (Computer Science)
Semester – IV
PHYSICS

PHY241B

ATOMIC AND MOLECULAR SPECTRA

(THEORY)

Credit Hours (per week): 3
Time: 3 Hours **Total Hours: 45**
Maximum Marks: 25
Pass Marks: 35%

Note for paper setter and students:

1. **There will be five sections.**
2. **Section A carries 5 marks and is compulsory consisting of seven short answer type questions of 1 marks eachcovering the whole syllabus. The candidate will have to attempt five questions in section A.**
3. **Sections B, C, D and E will be set from units I, II, III & IV respectively and will consist of two questions of 5 marks each from the respective unit. The candidates are required to attempt one question from each of these sections.**
4. **Scientific calculator is allowed.**

Course Objectives: The main course objective of this subject to understand the main catastrophe of different theories for explaining the structure of atom and origin of the observed spectra, Bohr's theory and Zeeman effect, electronatomic spectra effects and different quantum numbers required for complete explanation, Interpret the many electron atomic spectra of helium, alkaline atoms with LS couplings and selection rules, X-ray and molecules spectra and Raman effect.

Course Contents:

UNIT–I

Introduction to Atomic Spectra: Observation of spectra, Types of spectra, Light sources, Spectral analysis, Units in spectroscopy, Bohr's Theory, Spectral series, Representation of spectral lines by terms, Energy level Diagram, Bohr's correspondence Principle, Ritz combination Rule, Continuum at series limit, Evidences in favour of Bohr's Theory, Experimental confirmation of Bohr's theory, Frank-Hertz Experiment.

UNIT–II

One Electrom Atomic Spectra: Spectrum of Hydrogen atom, Line structure, Normal Zeeman effect, electron spin, Stern Gerlach experiment, spin orbit coupling, electron magnetic moment, total angular momentum, Hyperfine structure, examples of one electron systems, anomalous Zeeman effect, Lande g factor (Sodium D-Lines).

UNIT–III

Many Electron System Spectra:Exchange symmetry of wave function, exclusion principle, shells, subshells in atoms, atomic spectra (Helium), spectra of alkaline earth atoms, LS coupling, selection rules, Regularities in atomic spectra.

UNIT–IV

Interaction energy ideas, X-ray spectra, Mosley law, Absorption spectra, Auger effect, Molecular bonding, Molecular spectra, selection rules, symmetric structure, Rotational Vibrational, electronic level and spectra of molecules, Raman spectra. Introduction to Raman spectra

References:

1. Introduction to Atomic Spectra: H.E. White-Auckland McGraw Hill, 1934.
2. Fundamentals of Molecular Spectroscopy: C.B. Banwell-Tata McGraw Hill, 1986.
3. Spectroscopy Vol. I, II & III: Walker &Straughen
4. Introduction to Molecular Spectroscopy: G.M. Barrow-Tokyo McGraw Hill, 1962.
5. Spectra of Diatomic Molecules: Herzberg-New York, 1944.
6. Molecular Spectroscopy: Jeanne L McHale.
7.Optics and lasers, T S Bhatia, V K Sharma, Publishers PV's

Course Learning Outcomes	**On completing the course, the students will be able to:**
CO1	Describe the theories explaining the structure of atom and origin of the observed spectra.
CO2	Explain the experimental proof of different effects like Bohr's theory and Zeeman effect.
CO3	Identify the one electron atomic spectra effects and different quantum numbers required for complete explanation
CO4	Interpret the many electron atomic spectra of helium, alkaline atoms with LS couplings and selection rules.
CO5	Describe the X-ray and molecules spectra and understand the complete Raman effect.

B.Sc. (Computer Science)
Semester – IV
PHY241P

(PRACTICAL)

Credit Hours (per week): 4.5

Time: 3 Hours **Maximum Marks: 25**

Pass Marks: 35%

General Guidelines for Practical Examination:

I. The distribution of marks is as follows: **25Marks**

i) One experiment:**10 Marks**

ii) Brief Theory:**5 Marks**

iii) Viva–Voce:**5Marks**

iv) Record (Practical file):**5 Marks**

II. There will be one sessions of 3 hours duration. The paper will have one session.

Paper will consist of 8 experiments out of which an examinee will mark 6 experiments and

one of these is to be allotted by the external examiner.

III. Number of candidates in a group for practical examination should not exceed 12.

IV. In a single group no experiment be allotted to more than three examinee in any group.

Course Objectives: The main course objective of this subject to understand the main catastrophe of different theories for explaining the structure of atom and origin of the observed spectra, Bohr's theory and Zeeman effect, electronatomic spectra effects and different quantum numbers required for complete explanation, Interpret the many electron atomic spectra of helium, alkaline atoms with LS couplings and selection rules, X-ray and molecules spectra and Raman effect.

Course Contents:

1. To study adiabatic expansion of gas and hence to calculate value of γ.
2. To find the coefficient of Thermal Conductivity of a bad conductor by Lee's method.
3. To plot a calibration curve of a given thermocouple (copper constantan) using apotentiometer.
4. Study the Hydrogen gas discharge tube spectra and obtain the value of Rydberg constant.
5. To study the photoelectric effect and determine the value of Planck's constant.
6. To determine the ionization potential of mercury.
7. Study of variation of light intensity with distance using photovoltaic cell (Inverse Square Law)
8. To determine the heating efficiency of an electric kettle with varying voltage.
9. To study the absorption spectra of iodine vapours.
10. Determination of the wavelength of the semiconductor diode laser.
11. Verify Laws of probability distribution by throwing of similar coins.

References:

1. Practical Physics Vol. II, T.S. Bhatia, Gursharan Kaur, Iqbal Singh, Vishal Publications.
2. Practical Physics, C.L. Arora, S. Chand & Co.
3.

Course Learning Outcomes	**On completing the course, the students will be able to:**
CO1	Use the spectrometer to study Hydrogen and iodine absorption spectra.
CO2	Explain the heating efficiency of electric kettle with varying voltage.
CO3	Demonstrate the photoelectric effect, determination of Planck's constant and inverse square law
CO4	Determine Ionization potential of mercury.
CO5	Find the Thermo emf and its variation with temperature.

B.Sc. (Computer Science)

Semester – IV

MAT-241A: STATICS AND VECTOR CALCULUS

Medium: English

Max. Marks: 50

Time: 3 Hours **Theory Marks: 38**

Credit Hours(per week):04 **Internal Assessment: 12**

Total Hours:60

Instructions for the Paper Setters:

1. The question paper will consist of three sections namely Section-A which will be from entire syllabus (equally distributed from each unit), Section–B from UNIT-I and Section–C from UNIT-II.
2. The Section–A will consist of eight compulsory questions, each of one mark.
3. The Section–B &C will consist of five questions each. Students are to attempt any five questions in total by selecting at least two questions from section-B & 4. 4. C. Each question carries 6 marks.
5. Teaching time for this paper would be six periods per week.

COURSE OBJECTIVES:

1. The content of this course is designed to make the students understand the resolution and composition of a number of forces.
2. Students will understand the concept of parallel forces and couples, the concept of moments of forces and couples about a point and a line, friction and its applications.
3. Studenst will learn the differentiation and integration of vector functions, properties of gradient, divergence and curl, the applications of Gauss divergence theorem, Stoke's theorem and Green's theorem.

UNIT-I

Composition and resolution of forces (parallelogram law, triangle law, polygon law, Lami's Theorem, □ - μ theorem). Resultant of a number of coplanar forces, parallel forces. Moments, Varignon's theorem of moments, Couples, Resultant of two Coplanar Couples, Equilibrium of two coplanar couples, Resultant of a force and a couple. Equilibrium of coplanar forces.

UNIT-II

Friction, Laws of friction, Equilibrium of a particle on a rough plane. Centre of Gravity: Centre of gravity of a rod, triangular lamina, solid hemisphere, hollow hemisphere, solid cone and hollow cone.

UNIT-III

Vector differentiation, Gradient, divergence and curl operators, line integrals, Vector identity, Vector integration,

UNIT-IV

Theorems of Gauss, Green, Stokes and problems based on these.

References:

1. S.L. Loney: Statics, Macmillan and Company, London.
2. R.S. Verma: A Text Book on Statics, Optical Pvt. Ltd., Allahabad.
3. Spiegal, M.R.: Introduction to Vector Calculus and Tensor.

4. Spiegal, M.R.: Vector Analysis.

Course Outcomes:

On completing the course, the students will be able to:

CO-1.	Understand the study of system of forces in equilibrium and differentiation and integration of vector functions.
	Define the resolution and composition of a number of forces, parallel forces and couples, moments of forces and couples about a point and a line.
CO-2.	Generalise the theory behind the friction and centre of gravity.
CO-3.	Memorize definition of directional derivative and gradient and illustrate geometric meanings with the aid of sketches.
CO-4.	Apply the concept of a vector integration in a plane and in space.
CO-5.	Understand the study of system of forces in equilibrium and differentiation and integration of vector functions.

B.Sc. (Computer Science)
Semester – IV
MAT-241B: SOLID GEOMETRY

Medium: English

Max. Marks: 50
Time: 3 Hour **Theory Marks: 37**
Credit Hours(per week):04 **Internal Assessment: 13**
Total Hours:60

Instructions for the Paper Setters:
The question paper will consist of three sections namely Section-A which will be from entire syllabus (equally distributed from each unit), Section–B from UNIT-I and Section–C from Unit II.
The Section–A will consist of seven compulsory questions, each of one mark.
The Section–B &C will consist of five questions each. Students are to attempt any five questions in total by selecting at least two questions from section-B & C. Each question carries 6 marks.
Teaching time for this paper would be six periods per week.

COURSE OBJECTIVES:

1. It will help students togeneralises the concepts and ideas of plane geometry.
2. It will give students the basic geometric views of shape, size, length, angle, volume, surface area, rotation, translation, location etc. associated with any figure.
3. Students will understand its applications in 3-D modelling, Architectural designing, 3-D Computer graphics.
4. This subject will make the students to understand the concepts and properties of solids like cone, right circular cone, cylinder, right circular cylinder and sphere.

UNIT-I

Cylinder as surface generated by a line moving parallel to a fixed line and through a fixed curve. Different kinds of cylinders such as right circular, elliptic, hyperbolic and parabolic in standard forms

UNIT-II

Cone with a vertex at the origin as the graph of homogeneous equation of second degree in x, y, z. Cone as a surface generated by a line passing through a fixed curve and a fixed point outsidethe plane of the curve, right circular and elliptic cones.

UNIT-III

Equation of surface of revolution obtained by rotating the curve $f(x,y)=0$ about the z-axis in the form of $f(x^2+y^2,z)=0$, Equation of ellipsoid, hyperboloid and paraboloid in standard forms.

UNIT-IV

Surfaces represented by general equation of 2^{nd} degree $S = 0$. Tangent lines, tangent planes and Normal plane.

References:

1. Narayan, S. & Mittal, P.K. : Analytical Solid Geometry, S. Chand & Co.

2. Kreyszig, E.: Advanced Engineering Mathematics, John Wiley & Sons.

Course Outcomes:

On completing the course, the students will be able to:

CO-1.	Understand the concept of 3-D Euclidean geometry.
CO-2.	Generalise the concepts and ideas of plane geometry.
CO-3.	Understand the basic geometric views of shape, size, length, angle, volume, surface area, rotation, translation, location etc. associated with any figure.
CO-4.	Learn about the applications of solid geometry in 3-D modelling, Architectural designing, 3-D Computer graphics.
CO-5.	Understand the concepts and properties of solids like cone, right circular cone, cylinder, right circular cylinder and sphere.

B.Sc. (Computer Science)
SEMESTER–IV

Course Code: ESL–222

Course Title: ENVIRONMENTAL STUDIES–II (COMPULSORY)

Credit Hours (Per Week): 2

Total Hours : 30 **Maximum Marks : 50 Marks**

Instructions for Paper Setters: The question paper will consist of three sections. Candidate will be required to attempt all the sections. Each unit of the syllabus should be given equal weightage of marks. Paper to be set in English, Punjabi and Hindi.

Section–A: (16 Marks): It will consist of five short answer type questions. Candidates will be required to attempt four questions, each question carrying four marks. Answer to any of the questions should not exceed two pages.

Section–B: (24 Marks): It will consist of five questions. Candidates will be required to attempt four questions, each question carrying six marks. Answer to any of the questions should not exceed four pages.

Section–C: (10 Marks): It will consist of two questions. Candidate will be required to attempt one question (carrying ten marks) only. Answer to the question should not exceed 5 pages.

Course Objectives

CO-1	To study the concept of Biodiversity – role, importance, values and its conservation. Hot spots and threats to biodiversity.
CO-2	To create awareness regarding environmental pollution, its causes and effects and preventive measure to control the different types of pollution.
CO-3	To make students aware of growing human population – causes and concern. Family welfare programs. Road safety (Traffic) rules.
CO-4	To know about entrepreneurship development and civil/self defense.

Unit-I

Biodiversity and its Conservation:

- Definition: Genetic, species and ecosystem diversity.
- Biogeographical classification of India.

- Value of Biodiversity: Consumptive use; productive use, social, ethical, aesthetic and option values.
- Biodiversity of global, National and local levels.
- India as mega-diversity nation.
- Hot-spots of biodiversity.
- Threats to Biodiversity: Habitat loss, poaching of wild life, man wildlife conflicts.
- Endangered and endemic species of India.
- Conservation of Biodiversity: In situ and Ex-situ conservation of biodiversity.

Unit-II

Environmental Pollution:

- Definition, causes, effects and control measures of:
  a) Air Pollution

  b) Water Pollution

  c) Soil Pollution

  d) Marine Pollution

  e) Noise Pollution

  f) Thermal Pollution

  g) Nuclear Hazards

  h) Electronic Waste

- Solid Waste Management: Causes, effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution.
- Pollution case studies.
- Disaster Management: Floods, Earthquake, Cyclone and Landslides.

Unit-III

Human Population and the Environment

- Population growth, variation among nations.
- Population explosion-Family welfare programme.
- Environment and human health.
- Human rights.
- Value education.
- HIV/AIDS.
- Women and child welfare.
- Role of information technology in environment and human health.
- Case studies.
- Road Safety Rules & Regulations**:** Use of Safety Devices while Driving, Do's and Don'ts while Driving, Role of Citizens or Public Participation, Responsibilities of Public under Motor Vehicle Act, 1988, General Traffic Signs.

- Accident & First Aid**:** First Aid to Road Accident Victims, Calling Patrolling Police & Ambulance.

it-IV

National Service Scheme:

- **Entrepreneurship Development:** Definition & Meaning; Qualities of good entrepreneur; Steps/ ways in opening an enterprise; Role of financial and support service Institutions.
- **Civil/Self Defense:** Civil defense services, aims and objectives of civil defense; Needs for self-defense training.

Field Visits:

- Visit to a local area to document environmental assets–river/forest/grassland/hill/ mountain.
- Visit to a local polluted site–Urban/Rural/Industrial/Agricultural.
- Study of common plants, insects, birds.
- Study of simple ecosystems–pond, river, hill slopes etc.
- Contribution of the student to NSS/any other social cause for service of society.
- Visit to Museum/Science City

Note: In this section the students will be required to visit and write on the environment of an area/ ecosystem/vi1lage industry/disaster/mine/dam/agriculture field/waste management/hospital etc. with its salient features, limitations, their implications and suggestion for improvement.

References/Books:

1. Agarwal, K. C. 2001. Environmental Biology, Nidhi Publications Ltd. Bikaner.
2. Bharucha, E. 2005. Textbook of Environmental Studies, Universities Press, Hyderabad.
3. Down to Earth, Centre for Science and Environment, New Delhi.
4. Jadhav, H. & Bhosale, V. M. 1995. Environmental Protection and Laws. Himalaya Pub.
5. Joseph, K. and Nagendran, R. 2004. Essentials of Environmental Studies, Pearson Education (Singapore) Pte. Ltd., Delhi.
6. Kaushik, A. & Kaushik, C. P. 2004. Perspective in Environmental Studies, New Age International (P) Ltd, New Delhi.
7. Miller, T. G. Jr. 2000. Environmental Science, Wadsworth Publishing Co.
8. Sharma, P. D. 2005. Ecology and Environment, Rastogi Publications, Meerut.
9. Booklet on Safe Driving. Sukhmani Society (Suvidha Centre), District Court Complex, Amritsar
10. Kanta, S., 2012. Essentials of Environmental Studies, ABS Publications, Jalandhar.

Course Outcomes

CO-1	To know about the meaning of Biodiversity and its role in environment.
CO-2	To know about the causes of different forms of pollution and their control measures.
CO-3	To know about the causes and challenges of growing human population. Women and child welfare programs.
CO-4	To know the development of entrepreneurship and techniques of civil/self defense.

B.Sc. (Computer Science)

Semester – V

Sr. No.	Course Code	Paper Name		Marks				Page No.
				Theory	Practical	Internal Assessment	Total	
1	BENC-3505	ENGLISH (COMPULSORY)		37	-	13	50	364-365
2	BPBI3501/BPBI3502/BPHC-3504	Punjabi/Basic Punjabi (Mudhli Punjabi) (Compulsory)/ Punjab History & Culture		37		13	50	366-369
3	CSC-351	COMPUTER SCIENCE (Data Base Management System & Oracle)		56	19	19Theory 06 Practical	100	370-372
4	PHY351A	Physics	CONDENSED MATTER PHYSICS	25	-	25	100	373-378
	PHY351B		NUCLEAR PHYSICS	25	-			
	PHY351P		Practical		25			
5	MAT-351A	Mathematics		Dynamics	38	-	12	50	379-382
	MAT-351B			Number Theory	37		13	50	

B.Sc. (Computer Science)
Semester – V

BENC-3505: ENGLISH COMPULSORY

Time: 3 Hours **Max. Marks : 50**
Theory :37
Credit Hours (per week) :4 **Internal Assessment:13**
Total Hours:60

Instructions for the Paper Setter and Distribution of Marks:
The question paper will consist of three sections and the distribution of marks will be as under:
Section A: 08 Marks
Section B: 20 Marks
Section C: 09 Marks
Section–A : Twelve (12) Questions on the usage of grammar related to the prescribed units of *Murphy's English Grammar*
will be set for the students to attempt any **Eight (8)** (1X8= 8 Marks)

Section–B: THREE questions requiring brief descriptive answers based on character, tone, plot and theme in the play ***All My Sons*** will be set and examinees will be expected to attempt **any TWO** (2X5= 10 Marks)

I. **THREE** questions on central idea, theme, tone or style etc. of the prescribed poems from the textbook, *Poems of Nature and Culture* will be set for the students to attempt **any TWO** question. (2X5 = 10 Marks)

Section–C: TWO Questions, one each from ***All My Sons*** and ***Poems of Nature and Culture*** **(250-300 words)** will be set for the students to answer **ANY ONE.** (1X5 = 5 Marks)

II. Guided Composition (With Given Hints) in about 150-200 words. (1X4=4 Marks)

Course Objectives:

1. To familiarize learners with different perspectives of approaching this literature.
2. To introduce them to drama as a performing art
3. To enhance their understanding of the elements of theatre
4. To enable the learners to critically watch a play
5. To provide knowledge of the underlying 'rules' of grammar.
6. To develop effective writing skills so as enable students to write in clear, concise, persuasive and audience centred manner.

Course Contents:

1. The study of the whole text of the play , *All My Sons*
2. **The study of the following poems from the prescribed book *Poems of Nature and Culture***
    - William Wordsworth : The World Is Too Much With Us
      : The Solitary Reaper
    - Gordon Lord Byron : She walks in Beauty
    - P.B. Shelley : Ozymandias
    - Alfred Lord Tennyson : In Memoriam
    - Mathew Arnold : Dover Beach
    - W. B. Yeats : Words
    - Walter De La Mare : The Listeners
    - W.H. Auden : The Unknown Citizen
    - Dylan Thomas : Do not Go Gentle into That Good Night
    - Rabindranath Tagore : False Religion
    - Nissim Ezekiel : Night Of Scorpion
3. **Unit No. 47-48, 113-120 from *Murphy's English Grammar.***

References:

1. *All My Sons* by Arthur Miller.
2. *Poems of Nature and Culture,* Guru Nanak Dev University Amritsar
3. ***Murphy's English grammar 4th Edition* (by Raymond Murphy) CUP**

Course Outcomes:

CO-1.	Widen their knowledge about various literary devices used in poetry such as tone, style, imagery, figures of speech, symbolism etc.
CO-2.	Develop power of imagination and appreciate the beauty, rhyme, and style of a poem.
CO-3.	Analyze and appreciate the dramatic technique, plot development and art of characterisation in the prescribed play.
CO-4.	Develop an understanding of the insights, genres, conventions and experimentations associated with English Drama.
CO-5.	Develop the knowledge, skills and capabilities for effective business writing such as letter writing.

B.Sc. (Computer Science)
Semester – V
BPBI-3501
ਲਾਜ਼ਮੀ ਪੰਜਾਬੀ

ਸਮਾਂ : 3 ਘੰਟੇ ਕ੍ਰੈਡਿਟ ਪ੍ਰਤੀ ਹਫਤਾ : 04
ਕੁੱਲ ਘੰਟੇ : 60 ਥਿਊਰੀ ਅੰਕ : 37, ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ : 13, ਕੁੱਲ ਅੰਕ : 50

ਅੰਕ-ਵੰਡ ਅਤੇ ਪ੍ਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

- ਸਿਲੇਬਸ ਦੇ ਚਾਰ ਭਾਗ ਹਨ ਪਰ ਪ੍ਰਸ਼ਨ-ਪੱਤਰ ਦੇ ਪੰਜ ਭਾਗ ਹੋਣਗੇ। ਪਹਿਲੇ ਚਾਰ ਭਾਗਾਂ ਵਿਚ 02-02 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰੇਕ ਭਾਗ ਵਿਚੋਂ 01-01 ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਲਾਜ਼ਮੀ ਹੋਵੇਗਾ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ (08) ਅੰਕ ਹੋਣਗੇ। ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਪੰਜਵੇਂ ਭਾਗ ਵਿਚ ਸਾਰੇ ਸਿਲੇਬਸ ਵਿਚੋਂ 01-01 ਅੰਕ ਦੇ ਛੇ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ, ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ 05 ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ ਦੇਣਾ ਲਾਜ਼ਮੀ ਹੋਵੇਗਾ। ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ-ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।
  ਨੋਟ: ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ 13 ਅੰਕਾਂ ਦੀ ਹੈ, ਜੋ ਕਾਲਜ ਵੱਲੋਂ ਨਿਰਧਾਰਿਤ ਦਿਸ਼ਾ ਨਿਰਦੇਸ਼ਾਂ ਅਨੁਸਾਰ ਥਿਊਰੀ ਅੰਕਾਂ ਤੋਂ ਵੱਖਰੀ ਹੋਵੇਗੀ। ਇਸ ਪੇਪਰ ਦੇ ਕੁੱਲ ਅੰਕ 37+13 = 50 ਹਨ।

ਕੋਰਸ ਦਾ ਉਦੇਸ਼ Course Objective

- ਵਿਦਿਆਰਥੀਆਂ ਦੀਆਂ ਸਾਹਿਤਕ ਰੁਚੀਆਂ ਨੂੰ ਵਧਾਉਣਾ।
- ਸਾਹਿਤਕ ਸਮਝ ਨੂੰ ਹੋਰ ਪਕੇਰਾ ਕਰਨਾ।
- ਭਾਸ਼ਾਈ ਗਿਆਨ ਵਿਚ ਵਾਧਾ ਕਰਨਾ।

ਪਾਠ-ਕ੍ਰਮ ਨਤੀਜੇ Course Outcomes (COs)

- ਵਿਦਿਆਰਥੀ ਦੀ ਸਾਹਿਤਕ ਸਮਝ ਪਕੇਰੀ ਹੋਵੇਗੀ।
- ਵਿਦਿਆਰਥੀ ਆਧੁਨਿਕ ਕਹਾਣੀ ਦੇ ਵਿਸ਼ੇਗਤ ਸਰੋਕਾਰਾਂ ਤੋਂ ਜਾਣੂ ਹੋਵੇਗਾ।
- ਵਿਦਿਆਰਥੀ ਨੂੰ ਸਵੈਜੀਵਨੀ ਦੇ ਵਿਧਾਗਤ ਸਰੂਪ ਬਾਰੇ ਗਿਆਨ ਹਾਸਿਲ ਹੋਵੇਗਾ।
- ਵਿਦਿਆਰਥੀ ਵਿਚ ਅਨੁਵਾਦ ਕਲਾ ਦਾ ਵਿਕਾਸ ਹੋਵੇਗਾ।
- ਵਿਦਿਆਰਥੀ ਭਾਸ਼ਾਈ ਗਿਆਨ ਹੋਰ ਵਿਕਸਿਤ ਹੋਵੇਗਾ।

ਪਾਠ-ਕ੍ਰਮ

ਭਾਗ-ਪਹਿਲਾ

ਨਵੀਂ ਪੰਜਾਬੀ ਕਹਾਣੀ

ਡਾ. ਮਹਿਲ ਸਿੰਘ ਅਤੇ ਡਾ. ਆਤਮ ਸਿੰਘ ਰੰਧਾਵਾ (ਸੰਪਾ.), ਸਿੰਘ ਬ੍ਰਦਰਜ਼, ਅੰਮ੍ਰਿਤਸਰ।
(ਪਹਿਲੀਆਂ ਪੰਜ ਕਹਾਣੀਆਂ ਵਿਚੋਂ ਸਾਰ/ਵਿਸ਼ਾ-ਵਸਤੂ/ਪਾਤਰ ਚਿਤਰਨ)

ਭਾਗ-ਦੂਜਾ

ਏਹੁ ਹਮਾਰਾ ਜੀਵਣਾ

ਦਲੀਪ ਕੌਰ ਟਿਵਾਣਾ, ਲੋਕਗੀਤ ਪ੍ਰਕਾਸ਼ਨ, ਚੰਡੀਗੜ੍ਹ।
(ਨਾਵਲ ਦਾ ਸਾਰ/ਵਿਸ਼ਾ-ਵਸਤੂ/ਪਾਤਰ ਚਿਤਰਨ)

ਭਾਗ-ਤੀਜਾ

(ੳ) ਲਗਪਗ 200 ਸ਼ਬਦਾਂ ਵਿਚ ਪੈਰ੍ਹਾ ਰਚਨਾ
(ਅ) ਸਰਲ ਅੰਗਰੇਜ਼ੀ ਪੈਰ੍ਹੇ ਦਾ ਪੰਜਾਬੀ ਵਿਚ ਅਨੁਵਾਦ

ਭਾਗ-ਚੌਥਾ

ਵਿਆਕਰਨ :
(ੳ) ਪੰਜਾਬੀ ਧੁਨੀ ਵਿਉਂਤ
(ਅ) ਵਾਕਾਤਮਕ ਜੁਗਤਾਂ : ਮੇਲ ਤੇ ਅਧਿਕਾਰ

B.Sc. (Computer Science)
Semester – V
BPBI-3502
muFlI pMjwbI
(In Lieu of Compulsory Punjabi)

ਸਮਾਂ : 3 ਘੰਟੇ ਕ੍ਰੈਡਿਟ ਪ੍ਰਤੀ ਹਫਤਾ : 04
ਕੁੱਲ ਘੰਟੇ : 60 ਥਿਊਰੀ ਅੰਕ : 37, ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ : 13, ਕੁੱਲ ਅੰਕ : 50

ਅੰਕ-ਵੰਡ ਅਤੇ ਪ੍ਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

- ਪਹਿਲੇ ਭਾਗ ਵਿਚੋਂ ਪੰਜ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਤਿੰਨ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਲਾਜ਼ਮੀ ਹਨ। ਹਰ ਪ੍ਰਸ਼ਨ ਦੇ ਪੰਜ-ਪੰਜ ਅੰਕ ਹਨ। ਭਾਗ ਦੂਜਾ ਵਿਚੋਂ ਦੋ ਹਿੱਸਿਆਂ ਵਿਚ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹੋਣਗੇ। ਪਹਿਲੇ ਹਿੱਸੇ ਵਿਚ ਦੋ ਵਰਣਨਾਤਮਕ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜਿਸ ਵਿਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਲਾਜ਼ਮੀ ਹੋਵੇਗਾ। ਇਸ ਦੇ ਚਾਰ ਅੰਕ ਹਨ। ਦੂਜੇ ਹਿੱਸੇ ਵਿਚ ਤਿੰਨ ਪ੍ਰਸ਼ਨ ਦੋ-ਦੋ ਅੰਕਾਂ ਦੇ ਪੁੱਛੇ ਜਾਣਗੇ। ਭਾਗ ਤੀਜਾ ਵਿਚੋਂ ਨੈਤਿਕ ਸਿੱਖਿਆ ਨਾਲ ਸੰਬੰਧਿਤ ਤਿੰਨ ਕਹਾਣੀਆਂ ਦਿੱਤੀਆਂ ਜਾਣਗੇ ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਇਕ ਕਹਾਣੀ ਕਰਨੀ ਜ਼ਰੂਰੀ ਹੈ। ਇਸ ਦੇ ਅੱਠ ਅੰਕ ਹਨ। ਭਾਗ ਚੌਥਾ ਵਿਚੋਂ ਸਰਲ ਪੰਜਾਬੀ ਦਾ ਇਕ ਪੈਰ੍ਹਾ ਅੰਗਰੇਜ਼ੀ ਵਿਚ ਅਨੁਵਾਦ ਕਰਨ ਲਈ ਦਿੱਤਾ ਜਾਵੇ ਜਿਸ ਦੇ ਚਾਰ ਅੰਕ ਹੋਣਗੇ।
ਨੋਟ: ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ 13 ਅੰਕਾਂ ਦੀ ਹੈ, ਜੋ ਕਾਲਜ ਵੱਲੋਂ ਨਿਰਧਾਰਿਤ ਦਿਸ਼ਾ ਨਿਰਦੇਸ਼ਾਂ ਅਨੁਸਾਰ ਥਿਊਰੀ ਅੰਕਾਂ ਤੋਂ ਵੱਖਰੀ ਹੋਵੇਗੀ। ਇਸ ਪੇਪਰ ਦੇ ਕੁਲ ਅੰਕ 37+13 = 50 ਹਨ।

ਕੋਰਸ ਦਾ ਉਦੇਸ਼ Course Objective

- ਭਾਸ਼ਾਈ ਗਿਆਨ ਨੂੰ ਹੋਰ ਵਧਾਉਣਾ।
- ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੇ ਨਾਲ-ਨਾਲ ਪੰਜਾਬੀ ਸਾਹਿਤ ਨਾਲ ਜੋੜਨਾ।
- ਵਿਦਿਅਕ ਪ੍ਰਤਿਭਾ ਦੇ ਨਾਲ-ਨਾਲ ਨੈਤਿਕਤਾ ਨਾਲ ਜੋੜਨਾ।

ਪਾਠ-ਕ੍ਰਮ ਨਤੀਜੇ Course Outcomes (COs)

- ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਭਾਸ਼ਾ, ਉਪਭਾਸ਼ਾ ਤੇ ਟਕਸਾਲੀ ਭਾਸ਼ਾ ਪ੍ਰਤੀ ਸਮਝ ਵਿਕਸਿਤ ਹੋਵੇਗੀ।
- ਉਹ ਸਿੱਖ ਧਰਮ ਦੇ ਸਿਧਾਤਾਂ ਤੋਂ ਪ੍ਰੇਰਿਤ ਹੋਕੇ ਆਪਣੀ ਸ਼ਖ਼ਸੀਅਤ ਦੀ ਉਸਾਰੀ ਕਰੇਗਾ।
- ਨੈਤਿਕ ਸਾਹਿਤ ਵਿਦਿਆਰਥੀ ਦੀ ਸ਼ਖ਼ਸ਼ੀਅਤ ਨੂੰ ਹੋਰ ਨਿਖਾਰੇਗਾ।
- ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੇ ਨਾਲ-ਨਾਲ ਉਸ ਦੀ ਅੰਗਰੇਜ਼ੀ ਭਾਸ਼ਾ ਉੱਤੇ ਵੀ ਪਕੜ ਵਧੇਗੀ।

ਪਾਠ-ਕ੍ਰਮ

ਭਾਗ-ਪਹਿਲਾ

ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਅਤੇ ਉਪ-ਭਾਸ਼ਾ :

(ੳ) ਪੰਜਾਬੀ ਦੀਆਂ ਉਪ-ਭਾਸ਼ਾਵਾਂ : ਮਾਝੀ, ਮਲਵਈ, ਦੁਆਬੀ
(ਅ) ਪੰਜਾਬੀ ਦੀ ਟਕਸਾਲੀ ਭਾਸ਼ਾ

ਭਾਗ-ਦੂਜਾ

ਸਿੱਖ ਧਰਮ ਬਾਰੇ ਮੁਢਲੀ ਜਾਣਕਾਰੀ :

(ੳ) ਦਸ ਗੁਰੂ ਸਾਹਿਬਾਨ (ਜੀਵਨ ਤੇ ਸਿੱਖਿਆ)
(ਅ) ਗੁਰੂ ਗ੍ਰੰਥ ਸਾਹਿਬ

ਭਾਗ-ਤੀਜਾ

ਨੈਤਿਕ ਸਿੱਖਿਆ ਨਾਲ ਸੰਬੰਧਿਤ ਕਹਾਣੀਆਂ : 'ਏਕਤਾ ਵਿਚ ਬਲ', 'ਅੰਗੂਰ ਖੱਟੇ ਹਨ', 'ਜਿੱਥੇ ਚਾਹ ਉੱਥੇ ਰਾਹ', 'ਲਾਲਚ ਬੁਰੀ ਬਲਾ ਹੈ' ਅਤੇ 'ਅੰਤ ਭਲੇ ਦਾ ਭਲਾ'

ਭਾਗ-ਚੌਥਾ

ਪੰਜਾਬੀ ਤੋਂ ਅੰਗਰੇਜ਼ੀ ਅਨੁਵਾਦ

B.Sc. (Computer Science)
Semester – V
BPHC-3504: PUNJAB HISTORY&CULTURE (AD.1849-1947)
(Special Paper in lieu of Punjabi compulsory) (For those students who are not domicile of Punjab)

Time:3Hours **Total. Marks:50**
Credit Hours(per week):4 **Theory: 37**
Total Hours: 60 **Internal Assessment: 13**

Instructions for the Paper Setter:

The question paper consists of five units: I, II, III, IV and V. Units I, II, III and IV will have two questions each. Each question carries 8 marks. The students are to attempt one question from each unit approximately in 800 words. Unit-V consists of 7 short answer type questions to be set from the entire syllabus. Students are to attempt any 5 questions in about 20 words each. Each question carries 1mark.

Note: The examiner is to set the question paper in two languages: English & Hindi.

Course Objectives:

1.	The main objective of this course is to provide knowledge of history and culture of the Punjab to the students who are not domicile of the Punjab.
2.	It intends to provide the information regarding the annexation of the Punjab by the British, their administrative, economic and social policies and their impact on the history and culture of the Punjab.
3.	It also aims to highlight the role of the Punjabis in the national movement.

UNIT-I

1. Annexation of Punjab by the British.
2. BritishAdministration (1849-58).

UNIT-II

3. British Policy towards agriculture, industry, trade andcommerce.
4. Spread of ModernEducation.

UNIT-III

5. Socio-Religious Reform Movements: Namdhari, Singh Sabha and AryaSamaj.
6. Gadhar Movement and Jallianwala Bagh tragedy.

UNIT-IV

7. Gurdwara ReformMovement.
8. Contribution to freedom struggle: Non-cooperation; HSRA and Quit IndiaMovement.

References:-

1. Fauja Singh, *History and Culture of the Punjab*, Part II, Publication Bureau, Punjabi University, Patiala,1987.
2. _____, *Freedom Struggle in the Punjab*, Publication Bureau, Punjabi University, Patiala,1974.

3. J.S. Grewal, *The Sikhs of the Punjab*, New Cambridge House, New Delhi, 2005.
4. Kushwant Singh, *A History of the Sikhs*,Vol.II (1839-1998), Oxford University Press, Delhi,1991.
5. Satya M.Rai, *Heroic Tradition in the Punjab (1900-1947)*, Punjabi University, Patiala,1978.
6. P.N. Chopra, & M.N. Das, *A Social, Cultural & Economic History of India*,Vol.III, Macmillan India,1974.
7. K.C. Yadav ,*Haryana AitihasikSimhavalokan*, Haryana SahityaAkademy, Chandigarh,1991.
8. B. S. Saini, *The Social & Economic History of the Punjab 1901-1939*, EssEss Publications, Delhi,1975.
9. S.C. Mittal, *Freedom Movement in the Punjab (1905-29)*, Concept Publishing Company, Delhi,1977.

Course Outcomes:

After completion of the course, the students will be able to learn:

CO-1.	History and culture of the Punjab under the British rule.
CO-2.	British administrative structure in the Punjab.
CO-3.	CBritish economic policies in the Punjab.
CO-4.	CSpread of education and socio-religious consciousness in the Punjab.
CO-5.	Role of the Punjab in the national movement.

B.Sc. (Computer Science)
Semester – V
Computer Science
CSC-351: Data Base Management System & Oracle

Time: 3 Hours **Total Marks: 100**
Credit Hours (per week):4 **Theory Marks: 56**
Total Hours:60 **Theory Internal Assessment M: 19**
Practical Marks: 19
Practical Internal Assessment M: 06

Note: 1. Medium of Examination is English Language.
2.The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks.**

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks.**

Course Objectives:

1	To provide a sound introduction to the discipline of database management as a subject in its own right, rather than as a compendium of techniques and product-specific tools.
2	To familiarise the participant with the nuances of database environments towards an information-oriented data-processing oriented framework.

UNIT-I

DBMS

Introduction to database management system, components of DBMS, ER. Diagrams, Data Description Language, Data Manipulation Language, SQL.

Data Models: Hierarchical Model, Network Model and Relational Model, Relational Databases. Relational Algebra and Calculus , Normalisation.

Database Security, Protection, Integrity, Recovery, Concurrency Control, Decomposition.

Distributed Databases, Knowledge Base/Expert Systems and Object Oriented Databases.

UNIT-II
Oracle 10g

SQL * PLUS

Introduction to Oracle 10

SQL - DDL, DML, DCL.

Join methods & Sub query, Union, Intersection.

Built in Functions, View Security amongst users, Sequences, indexing, object features of Oracle 10.

PL/SQL
Introduction to PL/SQL.
Cursors - Implicit & Explicit.
Procedures, Functions & Packages.
Database Triggers.

References:

1 Desai B.C.: An Introduction to Database Systems, Galgotia Publishers.
2 Date C.J. An Introduction to Database Systems, Vol. I, Narosa Publishers.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Gain ability to handle large volumes of structured, semi-structured, and unstructured data using database technologies.
CO-2.	Appreciate the need for DB approach and understand the components and roles of DBMS
CO-3.	Apply DB system development life cycle to business problems
CO-4.	Implement a set of relations in the chosen DBMS
CO-5.	Do development and Administration using MySQL and to make students understand about to read and write files.

B.Sc. (Computer Science)
Semester – V

COMPUTER SCIENCE
CSC-351: Database Management System and Oracle
(Practical)

Credit Hours(per week):4 **Practical Marks: 19**
Total Hours:60 **Practical Internal Assessment M: 06**

Practical based on Database System and Oracle

B.Sc. (Computer Science)
Semester – V
PHY351A

CONDENSED MATTER PHYSICS

(THEORY)

Credit Hours (per week): 3

Time: 3 Hours **Total Hours: 45**

Maximum Marks: 25

Pass Marks: 35%

Note for paper setter and students:

1. **There will be five sections.**
2. **Section A carries 5 marks and is compulsory consisting of seven short answer type questions of 1 marks eachcovering the whole syllabus. The candidate will have to attempt five questions in section A.**
3. **Sections B, C, D and E will be set from units I, II, III & IV respectively and will consist of two questions of 5 marks each from the respective unit. The candidates are required to attempt one question from each of these sections.**
4. **Scientific calculator is allowed.**

Course Objectives: To understand the different crystal structures through detailed studies on the concepts of crystalline and amorphous solids, the idea of lattice, unit cell, different types of lattices and crystal systems. To attain an ability toanalyze the structure of different crystals by learning and understanding the basics of X-ray diffraction and crystallography through concepts of Reciprocal lattice and Brillion zones. Gaining a comprehensive view of the different classical and quantum models used to explain the properties of solids such as specific heat and to be able to differentiate between metals, semiconductors and Insulators by understanding the formation of energy bands.

Course Contents:

UNIT–I

Crystal structure, Symmetry operations for a two and three dimensional crystal, Twodimensional Bravais lattices, Three dimensional Bravais lattices, Basic primitive cells, Crystalplanes and Miller indices, Diamond and NaCl structure.

UNIT–II

Crystal Diffraction: Bragg's law, Experimental methods for crystal structure studies, Laueequations, Reciprocal lattices of SC, BCC and FCC, Brag's law in reciprocal lattice, Brillouinzones and its construction in two and three dimensions, Structure factor and atomic form factor.

UNIT–III

Lattice vibrations, Concepts of phonons, Scattering of photons by phonons, Vibration and monoatomic, linear chains, Density of modes, Einstein and Debye models of specific heat.

UNIT–IV

Free electron model of metals, Free electron, Fermi gas and Fermi energy, Band Theory: Kronig-Penney model, Metals and insulators, Qualitative discussion of the following: Conductivity andits variation with temperature in semiconductors, Fermi levels in intrinsic and extrinsicsemiconductors, band gap in semiconductors.

References:

1. Introduction to Solid State Physics by C. Kittel (Wiley Eastern)
2. Elements of Modern Physics by S.H. Patil (TMGH, 1985).
3. Solid State Physics by Puri and Babbar.
4. Condensed Matter Physics by T.S. Bhatia (Vishal Publishing Co.)

Course Learning Outcomes	**On completing the course, the students will be able to:**
CO1	Gain knowledge on classification of various crystal systems and crystal structures.
CO2	Understand the basics of X-ray diffraction and crystallography.
CO3	Comprehend the concept of Reciprocal lattice and Brillouin zones.
CO4	Get a comprehensive view of Fermi energy through classical and quantum free electron theory.
CO5	Understand the difference between metals, semiconductors and Insulators on the basis of formation of energy bands.

B.Sc. (Computer Science)
Semester – V
PHY351B

NUCLEAR PHYSICS

(THEORY)

Credit Hours (per week): 3

Time: 3 Hours **Total Hours: 45**

Maximum Marks: 25

Pass Marks: 35%

Note for paper setter and students:

1. **There will be five sections.**
2. **Section A carries 5 marks and is compulsory consisting of seven short answer type questions of 1 marks eachcovering the whole syllabus. The candidate will have to attempt five questions in section A.**
3. **Sections B, C, D and E will be set from units I, II, III & IV respectively and will consist of two questions of 5 marks each from the respective unit. The candidates are required to attempt one question from each of these sections.**
4. **Scientific calculator is allowed.**

Course Objectives: The main objective of the course is to impart the knowledge of nucleus structure and its properties, nuclear models for understanding dynamics. Students will learn about the nuclear reactions and transformations which is involved in the natural processes and also natural and artificial radioactivity decays and its applications in the various fields

Course Contents:

UNIT–I

I. Nuclear Properties: Constituents of nucleus, non-existence of electrons in nucleus, Nuclear mass and binding energy, features of binding energy versus mass number curve, nucleus radius, angular momentum and parity, nuclear moments: magnetic dipole moment and electric quadruple moment, properties of nuclear forces, Yukawa theory.

UNIT–II

II. Radioactive Decays: Modes of decay of radioactive nuclides and decay Laws, radioactive series and displacement law, radioactive dating, constituents of Cosmic rays, Alpha decay: Gamow's theory of alpha decay, barrier penetration as applied to alpha decay, Geiger Nuttal law, Beta decays: β-, β+ and electron capture decays, Neutrino hypothesis and its detection, parity violation in β decay, Gamma transitions: Excited levels, isomeric levels, Gamma transitions, internal conversion.

UNIT–III

III. Nuclear Reactions: Types of nuclear reactions, reactions cross section, conservation laws, Kinematics of nuclear reaction, examples of nuclear reactions,Q-value and its physical significance, compound nucleus, level width.

UNIT–IV

IV. Nuclear Models: Liquid drop model, semi-empirical mass formula, condition of stability, evidence for nuclear magic numbers, Shell Model, energy level scheme, angular momenta of nuclear ground states, parity and magnetic moment of nuclear ground states.

References:

1. Basic Ideas and Concepts in Nuclear Physics by K. Hyde
2. Introduction to Nuclear Physics: H.A. Enge
3. Nuclear Physics: I. Kaplan (Addison Wesley)
4. Nuclei and Particles by E. Segre

Course Learning Outcomes	**On completing the course, the students will be able to:**
CO1	Explain the ground state properties of the nucleus, the detailed nuclear structure and the concept nuclear force existing within the nucleus.
CO2	Understand the process of radioactivity through detailed studies on radioactive decay of elements, the laws governing the decay and the different modes of decay and also gain knowledge of its applications in different fields.
CO3	Apply the various aspects of nuclear reactions in view of compound nuclear dynamics, the concept of threshold energy and nuclear cross section. They will also understand the concept of Q value and its physical significance.
CO4	Comprehend the details of liquid drop and shell model to easily expose the structure of the nucleus.

B.Sc. (Computer Science)
Semester – V
PHY351P

(PRACTICAL)

Credit Hours (per week): 4.5

Time: 3 Hours **Maximum Marks: 25**

Pass Marks: 35%

General Guidelines for Practical Examination:

I. The distribution of marks is as follows:**25 Marks**

i) One experiment:**10 Marks**

ii) Brief Theory:**5Marks**

iii) Viva–Voce:**5 Marks**

iv) Record (Practical file):**5 Marks**

II. There will be one sessions of 3 hours duration. The paper will have one session.

Paper will consist of 8 experiments out of which an examinee will mark 6 experiments andone of these is to be allotted by the external examiner.

III. Number of candidates in a group for practical examination should not exceed 12.

IV. In a single group no experiment be allotted to more than three examinee in any group.

Course Objectives: To acquaint and make the students understand the working principle of PN junction and Zener diode and their applications in various circuits. Understand the working of Cathode ray oscilloscope and its usage in obtaining different waveforms.Gain precision in setting up circuits using various electronic components such as resistors, capacitors, PN diodes to understand the estimation of band gap of semiconducting material, calculation of coefficient of resistance and differentiating and integrating behavior of RC circuits.

Course Contents:

1. Measurement of reverse saturation current in p-n-junction diode at various temperatures and to find the approximate value of energy gap.
2. To draw forward and reverse bias characteristics of a p-n junction diode and draw a load line.
3. To trace the B-H curves for different materials using CRO and find the magnetic parameters from these.
4. To study the characteristics of a thermistor and find its parameters.
5. To study the response of RC circuit to various frequencies.
6. Study the working of CRO and measure voltage and frequency of AC and DC supply.
7. To compare the frequencies of oscillations produced by two audio oscillators using the Lissajous figures on CRO.
8. Study the working of LED, silicon and germanium diode.

9. To obtain the wave form of a given oscillator using a cathode ray oscilloscope.
10. To study the characteristics of a differentiating circuit using RC circuit.
11. To study the characteristics of a integrating circuit using RC circuit.
12. To draw the characteristics of a Zener diode.
13. Study the phase relation of RC and LC circuit using CRO.
14. Find the frequency of the AC mains using electrical vibrator.

References:

1. Practical Physics Vol. III, T.S. Bhatia, Gursharan Kaur, Iqbal Singh, Vishal Publications.
2. Practical Physics, C.L. Arora, S. Chand & Co.

Course Learning Outcomes	**On completing the course, the students will be able to:**
CO1	Understand about Characteristics of PN junction diode and determination of energy band gap .
CO2	Get the understanding of how a CRO works and how to measure voltage and frequency of AC and DC supply.
CO3	Draw Characteristics of Thermistor, LED, Zener diode and understand their functioning and related concepts.
CO4	Understand BH curve tracing for different materials using CRO.
CO5	Get the knowledge of working of differentiating and integrating circuit.

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Semester – V

MAT-351A: DYNAMICS

Medium: English

Max. Marks: 50

Total Hours:60
Credit Hours(per week):4 **Time: 3 Hour**
Theory Marks:38 **Internal Assessment: 12**

Instructions for the Paper Setters:

1. The question paper will consist of three sections namely Section-A which will be from entire syllabus (equally distributed from each unit), Section–B from UNIT-I and Section–C from UNIT-II.
2. The Section–A will consist of eight compulsory questions, each of one mark.
3. The Section–B &C will consist of five questions each. Students are to attempt any five questions in total by selecting at least two questions from section-B & C. Each question carries 6 marks.
4. Teaching time for this paper would be six periods per week.

COURSE OBJECTIVES:

1.	To understand the motion of particles in a straight line with constant acceleration.
2.	To get familiar with Newton's laws of motion.
3.	To understand the curvilinear motion, simple harmonic motion and the concept of work, power and energy.

UNIT–I

Rectilinear motion in a straight line with uniform acceleration, Newton's laws of motion. Motion of two particles connected by a string. Motion along a smooth inclined plane. Variable acceleration. Simple Harmonic Motion.

UNIT–II

Curvilinear motion of particle in a plane, Definition of velocity and acceleration, projectiles. Oscillations: Free Vibrations, Simple Pendulum, Conical Pendulum. Work, Power and Energy: Kinetic and Potential energy, Conservative forces. Theorem of conservation of energy. Work done against gravity.

References:

1. S.R.Gupta: A text book of Dynamics
2. F. Chorlton: Dynamics.
3. S.L. Loney: An Elementary Treatise on the Dynamics of a Practice and of Rigid Bodies, Cambridge University Press, 1956.

Course Outcomes:

On completing the course, the students will be able to:

CO-1.	Handle the problems based on rectilinear motion.
CO-2.	Use Newton's laws of motion in numerical problems.
CO-3.	Deal with problems based on variable acceleration.
CO-4.	Use concepts of work, power and energy to solve practical problems.

B.Sc. (Computer Science)

Semester – V

MAT-351 B : NUMBER THEORY

Medium: English

Time: 3 Hours **Max. Marks: 50**

Total Hours:60

Credit Hours(per week):4 **Theory Marks: 37**

Internal Assessment: 13

Instructions for the Paper Setters:

1. The question paper will consist of three sections namely Section-A which will be from entire syllabus (equally distributed from each unit), Section–B from UNIT-I and Section–C from UNIT-II.
2. The Section–A will consist of seven compulsory questions, each of one mark.
3. The Section–B &C will consist of five questions each. Students are to attempt any five questions in total by selecting at least two questions from section-B & C. Each question carries 6 marks.
4. Teaching time for this paper would be six periods per week

COURSE OBJECTIVES:

1.	Number theory is a branch of pure mathematics devoted primarily to the study of integers and integer-valued functions.
2.	Number theory have countless applications in mathematics as well in practical applications such as security system like in banking securities, coding theory, barcodes and memory management systems.
3.	The content of this course is designed to make the students understand the various types of numbers and their properties, various arithmetic functions, the concept of congruences to solve various arithmetic problems, G.C.D. and L.C.M. of numbers and the relation of linear Diophantine equations and congruences

UNIT–I

The division algorithm, The greatest common divisor, least common multiple, The Euclidean alogrithm, The Diophantine equation ax + by = c Prime numbers and their distribution, The fundamental theorem of arithmetic, Basic properties of congruences, Linear congruences, Special divisibility tests.

UNIT–II

Chinese remainder theorem, The Fermat's theorem, Wilson's theorem, τ and σ functions, Mobius Inversion formula, Greatest integer function, Euler's Phi function, Euler's theorem, some properties of the Phi Function. Application to Cryptpgraphy-Factorization methods due to Fermat, RSA.

References:

1. D. Burton: Elementary Number Theory, Sixth Edition, McGraw-Hill. (Scope in Chapters 2-5, 7-12)., 2005
2. Niven and Zuckerman: An Introduction to Number Theory, Wiley 1972.

Course Outcomes:

On completing the course, the students will be able to:

CO-1.	Know about some fascinating discoveries related to properties of prime numbers.
CO-2.	Interpret the concept of divisibility and fundamental theorem of Arithmetic.
CO-3.	Have knowledge about applications such as security system like in banking securities, coding theory, barcodes and memory management systems.
CO-4.	Understand the various types of numbers and their properties, various arithmetic functions.
CO-5.	Understand the concepts of G.C.D. and L.C.M. of numbers and the relation between linear Diophantine equations and congruencies which will help to solve various arithmetic problems.

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Semester – VI

Sr. No.	Course Code	Paper Name		Marks				Page No.
				Theory	Practical	Internal Assessment	Total	
1	BENC-3605	ENGLISH (COMPULSORY)		37	-	13	50	384-385
2	BPBI-3601/BPBI-3602/BPHC-3604	Punjabi/Basic Punjabi (Mudhli Punjabi) (Compulsory)/ Punjab History & Culture		37		13	50	386-389
3	CSC-361	COMPUTER SCIENCE (Programming using Python)		56	19	19Theory 06 Practical	100	390-392
4	PHY361A	Physics	Paper-A ELECTRONICS	25	-	25	100	393-398
	PHY361B		Paper-B RADIATION AND PARTICLE PHYSICS	25	-			
	PHY361P		Practical		25			
5	MAT-361A	Mathematics	Linear Algebra	38	-	12	50	399-402
	MAT-361B		Numerical Analysis	37		13	50	

B.Sc. (Computer Science)
Semester – VI

BENC-3605: ENGLISH COMPULSORY

Time: 3 Hours **Max. Marks : 50**
Credit Hours (per week):4 **Theory : 37**
Total Hours:60 **Internal Assessment :13**

Instructions for the Paper Setter and Distribution of Marks:

The question paper will consist of three sections and the distribution of marks will be as under:

Section A: 08 Marks

Section B: 20 Marks

Section C: 09 Marks

Section–A: Twelve (12) Questions on usage of grammar related to the prescribed units of ***Murphy's English Grammar*** will be set for the students to attempt **any Eight(8)**

(1X8= 8 Marks)

Section–B*:* THREE questions requiring brief descriptive answers based on character, tone, plot and theme in ***The Guide*** will be set and examinees will be expected to attempt **any TWO**
(2X5= 10 Marks)

I. **THREE** questions on central idea, theme, tone or style etc. of the prescribed one-act plays from the textbook, *Glimpses of Theatre* will be set for the students to attempt **any TWO** of these questions.

(2X5 = 10 Marks)

Section–C: TWO Questions, one from each literary text *(The Guide* and *Glimpses of Theatre*) will be set for the students to answer **ANY ONE.**
(1X5 = 5 Marks)

II. The student will be asked to write a Resume
(1X4 = 4 Marks)

Course Objectives:

1.	To enhance their understanding of the elements of theatre
2.	To enable the learners to critically watch a play
3.	To provide knowledge of the underlying 'rules' of grammar.

Course Contents:

The study of the whole text of the novel, *The Guide*

The study of the following one-act plays from the prescribed book, **Glimpses of Theatre**

The Will

Progress

The Monkey's Paw

3. Unit 38-41, 92-97 from ***Murphy's English Grammar***

References:

The Guide By R.K. Narayan
Glimpses of Theatre, Guru Nanak Dev University Amritsar.
Murphy's English grammar 4th Edition (by Raymond Murphy)

Course Outcomes:

CO-1.	Analyze and appreciate the dramatic technique, plot development and art of characterisation in the prescribed plays.
CO-2.	Comprehend, appreciate and critically analyse the novel "The English Teacher".
CO-3.	Enhance their reading and analysing power of texts through guided reading.
CO-4.	Develop skills for resume writing.

B.Sc. (Computer Science)
SEMESTER-VI
BPBI-3601
ਲਾਜ਼ਮੀ ਪੰਜਾਬੀ

ਸਮਾਂ : 3 ਘੰਟੇ ਕ੍ਰੈਡਿਟ ਪ੍ਰਤੀ ਹਫਤਾ : 04
ਕੁੱਲ ਘੰਟੇ : 60 ਥਿਊਰੀ ਅੰਕ : 37, ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ : 13, ਕੁੱਲ ਅੰਕ : 50

ਅੰਕ-ਵੰਡ ਅਤੇ ਪ੍ਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

- ਸਿਲੇਬਸ ਦੇ ਚਾਰ ਭਾਗ ਹਨ ਪਰ ਪ੍ਰਸ਼ਨ-ਪੱਤਰ ਦੇ ਪੰਜ ਭਾਗ ਹੋਣਗੇ। ਪਹਿਲੇ ਚਾਰ ਭਾਗਾਂ ਵਿਚ 02-02 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰੇਕ ਭਾਗ ਵਿਚੋਂ 01-01 ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਲਾਜ਼ਮੀ ਹੋਵੇਗਾ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ (08) ਅੰਕ ਹੋਣਗੇ। ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਪੰਜਵੇਂ ਭਾਗ ਵਿਚ ਸਾਰੇ ਸਿਲੇਬਸ ਵਿਚੋਂ 01-01 ਅੰਕ ਦੇ ਛੇ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ, ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ 05 ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ ਦੇਣਾ ਲਾਜ਼ਮੀ ਹੋਵੇਗਾ। ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ-ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।
  ਨੋਟ: ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ 13 ਅੰਕਾਂ ਦੀ ਹੈ, ਜੋ ਕਾਲਜ ਵੱਲੋਂ ਨਿਰਧਾਰਿਤ ਦਿਸ਼ਾ ਨਿਰਦੇਸ਼ਾਂ ਅਨੁਸਾਰ ਥਿਊਰੀ ਤੋਂ ਵੱਖਰੀ ਹੋਵੇਗੀ। ਇਸ ਪੇਪਰ ਦੇ ਕੁੱਲ ਅੰਕ 37+13 = 50 ਹਨ।

ਕੋਰਸ ਦਾ ਉਦੇਸ਼ Course Objective

- ਵਿਦਿਆਰਥੀ ਅੰਦਰ ਸਾਹਿਤਕ ਰੁਚੀਆਂ ਨੂੰ ਵਿਕਸਤ ਕਰਨਾ।
- ਸਾਹਿਤਕ ਰੂਪਾਂ ਸੰਬੰਧੀ ਜਾਣਕਾਰੀ ਵਿਚ ਵਾਧਾ ਕਰਨਾ।
- ਭਾਸ਼ਾਈ ਗਿਆਨ ਵਿਚ ਵਾਧਾ ਕਰਨਾ।

ਪਾਠ-ਕ੍ਰਮ ਨਤੀਜੇ Course Outcomes (COs)

- ਵਿਦਿਆਰਥੀ ਦੀ ਸਾਹਿਤਕ ਸਮਝ ਹੋਰ ਪਕੇਰੀ ਹੋਵੇਗੀ।
- ਵਿਦਿਆਰਥੀ ਸਫ਼ਰਨਾਮਾ ਦੇ ਵਿਧਾਗਤ ਸਰੂਪ ਤੋਂ ਜਾਣੂ ਹੋਵੇਗਾ।
- ਵਿਦਿਆਰਥੀ ਵਿਚ ਸਾਹਿਤ ਦੇ ਨਵੀਨ ਰੂਪਾਂ ਦੀ ਸਮਝ ਵਿਕਸਤ ਹੋਵੇਗੀ।
- ਵਿਆਕਰਨਕ ਸ਼੍ਰੇਣੀਆਂ ਬਾਰੇ ਜਾਣਕਾਰੀ ਵਧੇਗੀ।
- ਵਿਦਿਆਰਥੀ ਵਿਚ ਲੇਖ-ਰਚਨਾ ਦੀ ਸਮਝ ਵਿਕਸਤ ਹੋਵੇਗੀ।

ਪਾਠ-ਕ੍ਰਮ

ਭਾਗ-ਪਹਿਲਾ

ਨਵੀਂ ਪੰਜਾਬੀ ਕਹਾਣੀ

ਡਾ. ਮਹਿਲ ਸਿੰਘ ਅਤੇ ਡਾ. ਆਤਮ ਸਿੰਘ ਰੰਧਾਵਾ (ਸੰਪਾ.), ਸਿੰਘ ਬ੍ਰਦਰਜ਼, ਅੰਮ੍ਰਿਤਸਰ।
(ਪਿਛਲੀਆਂ ਪੰਜ ਕਹਾਣੀਆਂ ਵਿਚੋਂ ਸਾਰ/ਵਿਸ਼ਾ-ਵਸਤੂ/ਪਾਤਰ ਚਿਤਰਨ)

ਭਾਗ-ਦੂਜਾ

ਧਰਤੀਆਂ ਦੇ ਗੀਤ

ਬਰਜਿੰਦਰ ਸਿੰਘ ਹਮਦਰਦ, ਨਾਨਕ ਸਿੰਘ ਪੁਸਤਕਮਾਲਾ, ਅੰਮ੍ਰਿਤਸਰ।
(ਸਮਾਜ-ਸਭਿਆਚਾਰਕ ਪਰਿਪੇਖ/ਸਫ਼ਰਨਾਮੇ ਦੇ ਤੌਰ 'ਤੇ ਪਰਖ)

ਭਾਗ-ਤੀਜਾ

(ੳ) ਲੇਖ ਰਚਨਾ (ਵਿਗਿਆਨ, ਤਕਨਾਲੋਜੀ ਅਤੇ ਚਲੰਤ ਮਸਲਿਆਂ ਸੰਬੰਧੀ)
(ਅ) ਆਧੁਨਿਕ ਸਾਹਿਤ ਰੂਪ: ਕਹਾਣੀ, ਨਾਵਲ, ਸਫ਼ਰਨਾਮਾ ਤੇ ਸਵੈ-ਜੀਵਨੀ

ਭਾਗ-ਚੌਥਾ

ਵਿਆਕਰਨ :
(ੳ) ਵਿਆਕਰਨਕ ਸ਼੍ਰੇਣੀਆਂ : ਲਿੰਗ, ਵਚਨ ਅਤੇ ਕਾਰਕ
(ਅ) ਕਿਰਿਆ ਵਾਕੰਸ਼ : ਪਰਿਭਾਸ਼ਾ, ਬਣਤਰ ਅਤੇ ਪ੍ਰਕਾਰ

B.Sc. (Computer Science)
SEMESTER-VI
BPBI-3602
ਮੁਢਲੀ ਪੰਜਾਬੀ
(ਇਨ ਲਇੁ ਡ ਛੋਮਪੁਲਸੋਰੇ ਫੁਨਜਓਬਇ)

ਸਮਾਂ : 3 ਘੰਟੇ ਕ੍ਰੈਡਿਟ ਪ੍ਰਤੀ ਹਫਤਾ : 04
ਕੁੱਲ ਘੰਟੇ : 60 ਥਿਊਰੀ ਅੰਕ : 37, ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ : 13, ਕੁੱਲ ਅੰਕ : 50

ਅੰਕ-ਵੰਡ ਅਤੇ ਪ੍ਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

- ਭਾਗ ਪਹਿਲਾ ਵਿਚੋਂ ਕਵੀ ਦੇ ਜੀਵਨ ਅਤੇ ਰਚਨਾਵਾਂ ਬਾਰੇ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਦਾ ਉੱਤਰ ਦੇਣਾ ਹੋਵੇਗਾ। ਭਾਗ ਦੂਜਾ ਵਿਚੋਂ ਕਵਿਤਾ ਦੀ ਪ੍ਰਸੰਗ ਸਾਹਿਤ ਵਿਆਖਿਆ ਦੇ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਇਕ ਦਾ ਉੱਤਰ ਦੇਣਾ ਹੋਵੇਗਾ। ਭਾਗ ਤੀਜਾ ਵਿਚੋਂ ਕਿਸੇ ਦੋ ਕਹਾਣੀਆਂ ਦਾ ਵਿਸ਼ਾ-ਵਸਤੂ/ਸਾਰ ਪੁੱਛਿਆ ਜਾਵੇਗਾ, ਜਿਸ ਵਿਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨਾ ਲਾਜ਼ਮੀ ਹੋਵੇਗਾ। ਇਤਿਹਾਸਿਕ, ਸਭਿਆਚਾਰਕ, ਰਾਜਨੀਤਿਕ, ਸਮਾਜਕ, ਤੱਤਕਾਲੀਨ ਵਿਸ਼ਿਆਂ ਨਾਲ ਸੰਬੰਧਿਤ ਤਿੰਨ ਸਿਰਲੇਖ ਦਿੱਤੇ ਜਾਣਗੇ ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਇਕ ਵਿਸ਼ੇ ਨਾਲ ਸੰਬੰਧਿਤ ਲੇਖ ਲਿਖਣਾ ਹੋਵੇਗਾ।
  ਨੋਟ: ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ 13 ਅੰਕਾਂ ਦੀ ਹੈ, ਜੋ ਕਾਲਜ ਵੱਲੋਂ ਨਿਰਧਾਰਿਤ ਦਿਸ਼ਾ ਨਿਰਦੇਸ਼ਾਂ ਅਨੁਸਾਰ ਥਿਊਰੀ ਅੰਕਾਂ ਤੋਂ ਵੱਖਰੀ ਹੋਵੇਗੀ। ਇਸ ਪੇਪਰ ਦੇ ਕੁਲ ਅੰਕ 37+13 = 50 ਹਨ।

ਕੋਰਸ ਦਾ ਉਦੇਸ਼ Course Objective

- ਵਿਦਿਆਰਥੀ ਨੂੰ ਪੰਜਾਬੀ ਸਾਹਿਤ ਨਾਲ ਜੋੜਨਾ।
- ਸਾਹਿਤ ਸਿਰਜਣਾ ਵੱਲ ਪ੍ਰੇਰਿਤ ਕਰਨਾ।
- ਸਾਹਿਤ ਅਧਿਐਨ ਦੀ ਸਮਝ ਪੈਦਾ ਕਰਨਾ।

ਪਾਠ-ਕ੍ਰਮ ਨਤੀਜੇ Course Outcomes (COs)

- ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੰਜਾਬੀ ਸਾਹਿਤ ਦਾ ਵੱਧ ਤੋਂ ਵੱਧ ਅਧਿਐਨ ਕਰਨ ਦਾ ਮੌਕਾ ਮਿਲੇਗਾ।
- ਉਨ੍ਹਾਂ ਉਸ ਦੀ ਸ਼ਖ਼ਸੀਅਤ ਉਸਾਰੀ ਵਿਚ ਸਾਹਿਤ ਵਿਸ਼ੇਸ਼ ਨਿਭਾਏਗਾ।
- ਉਹ ਸਾਹਿਤ ਦੀ ਸਮਾਜਕ ਭੂਮਿਕਾ ਤੋਂ ਜਾਣੂ ਹੋਵੇਗਾ।
- ਲੇਖ-ਰਚਨਾ ਨਾਲ ਉਨ੍ਹਾਂ ਅੰਦਰ ਲੇਖਣ ਕਲਾ ਦਾ ਵਿਕਾਸ ਹੋਵੇਗਾ।

ਪਾਠ-ਕ੍ਰਮ

ਭਾਗ-ਪਹਿਲਾ

ਕਵੀ ਦਾ ਜੀਵਨ ਤੇ ਰਚਨਾਵਾਂ:
(ਓ) ਭਾਈ ਵੀਰ ਸਿੰਘ, (ਅ) ਪ੍ਰੋ. ਮੋਹਨ ਸਿੰਘ, (ਏ) ਅੰਮ੍ਰਿਤਾ ਪ੍ਰੀਤਮ, (ਸ) ਸੁਰਜੀਤ ਪਾਤਰ

ਭਾਗ-ਦੂਜਾ

ਕਵਿਤਾ ਦੀ ਪ੍ਰਸੰਗ ਸਹਿਤ ਵਿਆਖਿਆ:
ਭਾਈ ਵੀਰ ਸਿੰਘ : 'ਗੁਲਾਬ ਦਾ ਫੁੱਲ ਤੋੜਨ ਵਾਲੇ ਨੂੰ' ਅਤੇ 'ਸਮਾਂ'
ਪ੍ਰੋ. ਮੋਹਨ ਸਿੰਘ : 'ਕੋਈ ਆਇਆ ਸਾਡੇ ਵਿਹੜੇ' ਅਤੇ 'ਮਾਂ'
ਅੰਮ੍ਰਿਤਾ ਪ੍ਰੀਤਮ : 'ਆਖਾਂ ਵਾਰਸ ਸ਼ਾਹ ਨੂੰ'
ਸੁਰਜੀਤ ਪਾਤਰ : 'ਦਿਲ ਹੀ ਉਦਾਸ ਹੈ'

ਭਾਗ-ਤੀਜਾ

ਹੇਠ ਲਿਖੀਆਂ ਕਹਾਣੀਆਂ ਵਿਚੋਂ ਕਿਸੇ ਇਕ ਦਾ ਵਿਸ਼ਾ-ਵਸਤੂ ਜਾਂ ਸਾਰ :
ਨਾਨਕ ਸਿੰਘ : 'ਭੂਆ'
ਕਰਤਾਰ ਸਿੰਘ ਦੁੱਗਲ : 'ਕਰਾਮਾਤ'
ਅਜੀਤ ਕੌਰ : 'ਇੰਤਜ਼ਾਰ'

ਭਾਗ-ਚੌਥਾ

ਇਤਿਹਾਸਿਕ/ਸਭਿਆਚਾਰਕ/ਰਾਜਨੀਤਿਕ/ਸਮਾਜਕ/ਤਤਕਾਲੀਨ ਵਿਸ਼ਿਆਂ ਸੰਬੰਧੀ ਲੇਖ ਰਚਨਾ

B.Sc. (Computer Science)
SEMESTER-VI

BPHC-3604: PUNJAB HISTORY & CULTURE (AD. 1947-2000)

(Special Paper in lieu of Punjabi compulsory)
(For those students who are not domicile of Punjab)

Time: 3Hours **Total. Marks:50**
Theory: 37
Internal Assessment: 13

Instructions for the Paper Setter:
The question paper consists of five units: I, II, III, IV and V. Units I, II, III and IV will have two questions each. Each question carries 8 marks. The students are to attempt one question from each unit approximately in 800 words. Unit-V consists of 7 short answer type questions to be set from the entire syllabus. Students are to attempt any 5 questions in about 20 words each. Each question carries 1mark.
Note: The examiner is to set the question paper in two languages: English & Hindi.

Course Objectives:

1. The main objective of this course is to educate the students who are not domicile of the Punjab about the history and culture of Punjab.
2. It intends to teach them the main happenings in the Punjab such as partition of the Punjab and rehabilitation of the refugees after independence, creation of the Punjabi Suba and Green revolution and its impact.
3. It is also to educate them about the contemporary issues of the Punjab such as drug addiction, female foeticide and Punjabi Diaspora.

UNIT-I

1. Partition and its Impact onPunjab.
2. Rehabilitation.

UNIT-II

3. Punjabi Suba Movement and Reorganization Act of1966.
4. GreenRevolution.

UNIT-III

5. PunjabiDiaspora.
6. Development of education in Punjab afterIndependence.

UNIT-IV

7. Development of Punjabi Literature andDrama.
8. Emerging Concerns: Drug Addiction and Female Foeticide.

References:-

1. P.N. Chopra, & M.N. Das, *A Social, Cultural & Economic History of India*, Vol.III, Macmillan India, New Delhi,1974.
2. J.S. Grewal, *Social and Cultural History of Punjab: Prehistoric, Ancient and Early Medieval*, Foundation Books Pvt Ltd Cambridge House, New Delhi,2004.
3. *The Sikhs of Punjab*, New Cambridge House, New Delhi,20054.
4. Satya M. Rai ,*Heroic Tradition in Punjab(1900-1947),* Publication Bureau, Punjabi University, Patiala,1978.
5. Fauja Singh, *Freedom Struggle in Punjab*, Publication Bureau, Punjabi University, Patiala,1974.
6. _____, *History and Culture of the Punjab*, Part II, Publication Bureau, Punjabi University, Patiala,1987.
7. Kushwant Singh, *A History of the Sikhs*, Vol. II (1839-1998), Oxford University Press, Delhi,1991.
8. K.C. Yadav, *HaryanaAitihasikSimhavalokan,*Haryana SahityaAkademy, Chandigarh,1991

Course Outcomes:

After completion of the course, the students will be able to learn:

CO-1.	History and culture of the Punjab in the period under study.
CO-2.	The process of partition of the Punjab and problem of rehabilitation of therefugees after independence.
CO-3.	The creation of the Punjabi Suba and reorganization of its territory.
CO-4.	Green revolution and its impact on the Punjab.
CO-5.	Contemporary issues of the Punjab such as drug addiction, female foeticide and Punjabi Diaspora.

B.Sc. (Computer Science)
Semester – VI
CSC-361: Programming using Python

Time: 3 Hours **Total Marks: 100**
Credit Hours (per week):4 **Theory Marks: 56**
Total Hours:60 **Theory Internal Assessment M: 19**
Practical Marks: 19
Practical Internal Assessment M: 06

Note: 1. Medium of Examination is English Language.
2.The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **11 marks**. The total weightage of this section shall be **22 marks.**

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **11 marks**. The total weightage of this section shall be **22 marks.**

Course objectives:

1. Describe the core syntax and semantics of Python programming language.
2. Discover the need for working with the strings and functions.
3. Illustrate the process of structuring the data using lists, dictionaries, tuples and sets.
4. Infer the Object-oriented Programming concepts in Python.
5. To develop the ability to write database applications in Python.

UNIT-I

Introduction to Python: Process of Computational Problem Solving, Python Programming Language

Data and Expressions: Literals, Variables and Identifiers, Operators, Expressions, Statements and Data Types

Control Structures: Boolean Expressions (Conditions), Logical Operators, Selection Control, Nested conditions, Debugging

Lists: List Structures, Lists (Sequences) in Python, Iterating Over Lists (Sequences) in Python

Functions: Fundamental Concepts, Program Routines, Flow of Execution, Parameters & Arguments

Iteration: While statement, Definite loops using For, Loop Patterns, Recursive Functions, Recursive Problem Solving, Iteration vs. Recursion

UNIT-II

Dictionaries: Dictionaries and Files, Looping and dictionaries, Advanced text parsing
Files: Opening Files, Using Text Files, String Processing, Exception Handling
Objects and Their Use: Introduction to Object Oriented Programming
Modular Design: Modules, Top-Down Design, Python Modules
Using Databases and SQL: Database Concepts, SQLite Manager Firefox Add-on, SQL basic summary, Basic Data modeling, Programming with multiple tables

Reference Books:

1. Python for Informatics, Charles Severance, version 0.0.7
2. Introduction to Computer Science Using Python: A Computational Problem-Solving Focus, Charles Dierbach, Wiley Publications, 2012, ISBN : 978-0-470-91204-1
3. Introduction To Computation And Programming Using Python, GUTTAG JOHN V, PHI, 2014, ISBN-13: 978-8120348660
4. Introduction to Computating& Problem Solving Through Python, Jeeva Jose and Sojan P. Lal,Khanna Publishers, 2015, ISBN-13: 978-9382609810
5. Introduction to Computing and Programming in Python, Mark J. Guzdial, Pearson Education, 2015, ISBN-13: 978-9332556591
6. Fundamentals of Python by Kenneth Lambert, Course Technology, Cengage Learning , 2015
7. Learning Python by Mark Lutz, 5th Edition, O'Reilly Media, 2013.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Get knowledge of one of the latest and powerful programming languages – Python.
CO-2.	Understand about how to read and write files.
CO-3.	Get a broad view of the concept of Object Oriented Programming (OOP) applied in Python.
CO-4.	Learn how to connect Python programs to a database.
CO-5.	To learn how to identify Python object types.

B.Sc. (Computer Science)
Semester – VI
COMPUTER SCIENCE
(Practical)

Credit Hours (per week):4 **Practical Marks: 19**
Total Hours(per week):60 **Practical Internal Assessment M: 06**

Practical based on Programming using Python.

B.Sc. (Computer Science)
Semester – VI
PHYSICS

PHY361A

ELECTRONICS

(THEORY)

Credit Hours (per week): 3

Time: 3 Hours **Total Hours: 45**

Maximum Marks: 25

Pass Marks: 35%

Note for paper setter and students:

1. **There will be five sections.**
2. **Section A carries 5 marks and is compulsory consisting of seven short answer type questions of 1 marks eachcovering the whole syllabus. The candidate will have to attempt five questions in section A.**
3. **Sections B, C, D and E will be set from units I, II, III & IV respectively and will consist of two questions of 5 marks each from the respective unit. The candidates are required to attempt one question from each of these sections.**
4. **Scientific calculator is allowed.**

Course Objectives: This course provides the student with the fundamental to understand the basic of semiconductor and components like diode, transistor, FET, MOSFET and study of amplifiers, oscillators using transistor

Course Contents:

UNIT–I

Concepts of current and voltage sources, p-n junction, Biasing of diode, V-I characteristics,Rectification: half wave, full wave rectifiers and bridge rectifiers, Efficiency, Ripple factor,Qualitative ideas of filter circuits (LC and π filters), Introduction to Zener diode and voltage regulation, Tunnel diode Photonic devices (construction and working of solar cell, photodiode and LED).

UNIT–II

Junction transistor: Structure and working relation between different currents in transistors, Sign conventions, Amplifying action, Different configurations of a transistor and their comparison, CB and CE characteristics, Structure and characteristics of JEFT, Transistor biasing and stabilization of operating point, Voltage divider biasing circuit.

UNIT–III

Working of CE amplifier, Amplifier analysis using h-parameters, Equivalent circuits, Determination of current gain, Power gain, Input impedance, FET amplifier and its voltage gain, Feed back in amplifiers, Different types, Voltage gain, Advantage of negative feed back, Emitter follower as negative feedback circuit.

UNIT–IV

Barkausen criterion of sustained oscillations, LC oscillator (tuned collector, tuned base Hartley), RC oscillators, phase shift and WeinBridge.

References:

1. Basic Electronics and Linear Circuits by N.N. Bhargave, D.C. Kulshreshtha and S.C. Gupta.
2. Foundations of Electronics by D. Chatophadhyay, P.C. Rakshit, B. Saha and N.N. Purkit.
3. Basic Electronics by D.C. Tayal (Himalaya Pub.)

Course Learning Outcomes	**On completing the course, the students will be able to:**
CO1	Understand and analyze pn junctions in semiconductor devices.
CO2	Analyze simple rectifiers and voltage regulators using diodes.
CO3	Describe the behaviour of special purpose diodes.
CO4	Study different biasing techniques to operate transistor, FET, MOSFET. Study of amplifier analysis using hybrid parameters.
CO5	Know the concept of feedback in Amplifier and Oscillator, and study of different types of Oscillators.

B.Sc. (Computer Science)
Semester – VI
PHY361B

RADIATION AND PARTICLE PHYSICS

(THEORY)

Credit Hours (per week): 3

Time: 3 Hours **Total Hours: 45**

Maximum Marks: 25

Pass Marks: 35%

Note for paper setter and students:

1. **There will be five sections.**
2. **Section A carries 5 marks and is compulsory consisting of seven short answer type questions of 1 marks eachcovering the whole syllabus. The candidate will have to attempt five questions in section A.**
3. **Sections B, C, D and E will be set from units I, II, III & IV respectively and will consist of two questions of 5 marks each from the respective unit. The candidates are required to attempt one question from each of these sections.**
4. **Scientific calculator is allowed.**

Course Objectives: The main objective of the course to make the student to understand various interaction of charged particles with matter and the loss of energy due to ionization. To teach the principles of nuclear radiation detections and accelerators. To introduce the elementary particles, quarks and leptons, their properties, the quark model description of baryons and mesons.

Course Contents:

UNIT–I

I. Interaction of Radiation and Charged Particles With Matter: Energy loss of electrons and positrons, Positrons annihilation in condensed media, Sopping power and range of heavier charged, derivation of Bethe-Bloch formula, interaction of gamma rays with matter.

UNIT–II

II. Nuclear Radiation Detection: Gas-filled detectors, proportional and Geiger-Mueller counters, Scintillation detectors, semiconductor detectors, Cherenkov effect, solid state nuclear track detectors, bubble chambers, nuclear emulsions.

UNIT–III

III. Accelerators: Accelerators, linear accelerators, cyclic accelerators: cyclotron, synchrocyclotron, betatron, electron and proton synchrotron, phase stability, colliding beam machines: introduction to Large Hadron Collider and Fermilab Tevatron.

UNIT–IV

IV. Elementary Particles: Historical introduction, fermions and bosons, particles and antiparticles, Classification of particles, types of interactions, electromagnetic, weak, strong interactions, gravitational interactions, Quantum numbers and conservation laws, isospin, charge conjugation, Introduction to quarks and qualitative discussion of the quark model, high energy physics units.

References:

1. Basic Ideas and Concepts in Nuclear Physics by K. Hyde
2. Introduction to Nuclear Physics: H.A. Enge
3. Nuclear Physics: I. Kaplan (Addison Wesley)
4. Nuclei and Particles by E. Segre
5. Introduction to High Energy Physics by D.H. Perkins
6. Elementary Particles by I.S. Hughes

Course Learning Outcomes	**On completing the course, the students will be able to:**
CO1	Learn about the four fundamental forces of nature and their mutual interaction.
CO2	Understand the fundamental aspects of the structure of nucleus, nuclear reactions, interaction of radiation with matter and the process of energy loss by different radiations.
CO3	Gain knowledge about the principle, construction and working of various radiation detectors.
CO4	Learn about various linear and cyclic accelerators used to accelerate charged particles to high energies for carrying out nuclear reactions and their implementation in different research fields.
CO5	Understand the basic physics behind elementary particles, their classification according to the associated quantum numbers and the confirmation of unified theory with the discovered elementary particles.

B.Sc. (Computer Science)
Semester – VI
PHY361P

(PRACTICAL)

Credit Hours (per week): 4.5

Time: 3 Hours **Maximum Marks: 25**

Pass Marks: 35%

General Guidelines for Practical Examination:

I. The distribution of marks is as follows:**25 Marks**

i) One experiment:**10 Marks**

ii) Brief Theory:**5 Marks**

iii) Viva-Voce:**5 Marks**

iv) Record (Practical file):5 **Marks**

II. There will be one sessions of 3 hours duration. The paper will have one session.

Paper will consist of 8 experiments out of which an examinee will mark 6 experiments and one of these is to be allotted by the external examiner.

III. Number of candidates in a group for practical examination should not exceed 12.

IV. In a single group no experiment be allotted to more than three examinee in any group.

Course Objectives: The main course objective of this subject to follow pragmatic way of learning and describe the nature of electromagnetic wave and its propagation through different media.Built and design regulated power supplies and other instruments, logic circuits for various applications in real life.Detect the different types of radiations by using G.M. counter. Adopt the skills related to research, education, and industry by using electronics.

Course Contents:

1. To study the stabilization of output voltage of a power supply with Zener diode as function of input voltage and variable load resistance.
2. To draw output and mutual characteristics of an FET (Experiments) and determine its parameters.
3. To set up an Hartley oscillator and to study its output on CRO for different C values.
4. To draw the plateau of a GM counter and find its dead time.

5. To study the statistical fluctuations and end point energy of beta particles using GM counter.
6. To study the absorption of beta particles in aluminum using GM counter and determine the absorption coefficient of beta particles from it.
7. Study of a diode as a clipping element.
8. To measure the efficiency and ripple factors for (a) halfwave (b) full wave and (c) bridge rectifier circuits.
9. To study characteristics of Common Base transistor (pnp/npn) and determine h-parameters of a given transistor.
10. To study characteristics of Common Emitter transistor (pnp/npn).
11. To study the gain of an amplifier at different frequencies and to find Band width
12. To study the reduction in the ripple in the rectified output with RC, LC and л filters.
13. To study the diode as a clamping element.
14. To study the phase shift oscillator.
15. To study the Colpitt oscillator.

References:

1. Practical Physics Vol. III, T.S. Bhatia, Gursharan Kaur, Iqbal Singh, Vishal Publications.
2. Practical Physics, C.L. Arora, S. Chand & Co.

Course Learning Outcomes	**On completing the course, the students will be able to:**
CO1	Describe the nature of electromagnetic wave and its propagation through different media.
CO2	Build and design regulated power supplies and other instruments.
CO3	Develop logic circuits for various applications in real life.
CO4	Detect the different types of radiations by using G.M. counter.
CO5	Adopt the skills related to research, education, and industry by using electronics.

B.Sc. (Computer Science)
Semester – VI
MAT-361A: LINEAR ALGEBRA

Medium: English
Time: 3 Hours **Max. Marks: 50**
Credit Hours(per week):4 **Theory Marks: 38**
Total Hours:60 **Internal Assessment: 12**

Instructions for the Paper Setters:

1. The question paper will consist of three sections namely Section-A which will be from entire syllabus(equally distributed from each unit), Section–B from UNIT-I and Section–C from UNIT-II.
2. The Section–A will consist of eight compulsory questions, each of one mark.
3. The Section–B &C will consist of five questions each. Students are to attempt any five questions intotal by selecting at least two questions from section-B & C. Each question carries 6 marks.
4. Teaching time for this paper would be six periods per week.

COURSE OBJECTIVES:

1.	To understand the concepts of vector spaces, subspaces, bases, dimension and their properties.
2.	To get familiar with Quotient space, Direct sum, linear span and linear independence.
3.	To understand the concept of Rank and nullity of linear transformations.
4.	To relate matrices and linear transformations.

UNIT–I

Definition of groups, rings and fields with examples. Definition of a vector space, subspaces with examples. Direct sum of subspaces. Linear span, Linear dependence, Linear independence of vectors. Linear combination of vectors, Basis of a vector space, Finitely generated vector spaces. Existence theorem for basis. Invariance of the number of elements of the basis set.

Dimension of sum of two subspaces. Quotient space and its dimension.

UNIT–II

Linear transformation. Algebra of linear transformation. Rank- Nullity theorem, Isomorphism and Isomorphic spaces, Matrix of a linear transformation. Changes of basis, Linear operator.

References:

1. K.Hoffman & R. Kunze: Linear Algebra, 2nd Edition, Prentice Hall, New Jersey, 1971.
2. V. Krishnamurthy, V. P. Mainra and J.L. Arora: An Introduction to Linear Algebra, EastWest Press, 1976.
3. Shanti Narayan & P.K. Mittal: A Text Book of Matrices, 10th Edition (2002), S.Chand & Co.

4. Surjit Singh: Linear Algebra, 1997.

Course Outcomes:

CO-1.	Handle the problems based on vector spaces, subspaces, basis and dimensions.
CO-2.	Check the linear independence of vectors.
CO-3.	Form the linear combination of vectors.
CO-4.	Find the matrix corresponding to a linear transformation and vice versa.

B.Sc. (Computer Science)
Semester – VI
MAT-361 B: NUMERICAL ANALYSIS

Medium: English
Time: 3 Hours **Max. Marks: 50**
Credit Hours(per week):4 **Theory Marks: 37**
Total Hours:60 **Internal Assessment: 13**

Instructions for the Paper Setters:

1. The question paper will consist of three sections namely Section-A which will be from entire syllabus(equally distributed from each unit), Section–B from UNIT-I and Section–C from UNIT-II.
2. The Section–A will consist of seven compulsory questions, each of one mark.
3. The Section–B &C will consist of five questions each. Students are to attempt any five questions intotal by selecting at least two questions from section-B & C. Each question carries 6 marks.
4. Teaching time for this paper would be six periods per week.
5. Use of Non-programmable scientific calculator is allowed.

COURSE OBJECTIVES:

1.	Numerical analysis naturally finds application in all the fields of engineering and the physical sciences, but in the 21st century also the life sciences, social sciences, medicine, business and even the arts have adopted elements of scientific computations.
2.	The content of this course is designed to make the students understand the use of Numerical analysis in detecting errors in numerical calculations,
3.	It enables the students to solve linear and non-linear equations, in numerical differentiation and integration, to solve differential equations.

Unit–I

Error generation, propagation, error estimation and error bounds, Solution of non-linear equations, Bisection method, Iteration method, Newton's Method, Generalized Newton's Method, Method of false position, Muller's method, Rate of convergence of these methods. Solution of linear system of equation; Direct method, Gauss elimination variant (Gauss Jordan and Crout reduction), Triangular Method, Iterative Method, Jacobi's Method, Gauss Seidel Method. Finite Differences: Forward, Backward, Central, Divided differences, shift operator, relationship between the operators and detection of errors by use of difference operator.

Unit–II

Interpolation with divided difference, Newton's formula, Lagrangian Method, Finite difference interpolation, Gauss formula, Stirling formula, Bessel's formula, Error Estimation Extrapolation. Numerical differentiation, Method based on interpolation. Numerical Integration, Trapezoidal rule, Simpson's rule, Weddle rule, Romberg Integration, Gaussian integration method, Gaussian legendre integration. Double numerical integration. Numerical solution of ordinary differential equations, Initial value problem, Taylor's method, Euler's methods, Picard's method, Milne's Method, Runge-Kutta Method. Predictor- Corrector's Method.

References:

1. S.S. Sastry: Introductory Methods of Numerical Analysis, 2003 (3rd Edition), Prentice Hall ofIndia.

2. A. Maritava Gupta and Subash Ch. Bose: Introduction to Numerical Analysis.

Course Outcomes:

CO-1.	Understand the use of Numerical analysis in detecting errors in numerical calculations.
CO-2.	Solve linear and non-linear equations, in numerical differentiation and integration, to solve differential equations.
CO-3.	Have the knowledge of the study of algorithms that use numerical approximation for the problems of mathematical analysis.
CO-4.	Apply numerical analysis in all the fields of engineering, physical sciences, life sciences, social sciences, medicine, business and even the arts have adopted elements of scientific computations.
CO-5.	Analyze and evaluate the accuracy of common numerical methods.

SYLLABUS FOR THE BATCH FROM THE YEAR 2022 TO YEAR 2025

Programme Code: BAIDS

Programme Name: B.Sc. (Artificial Intelligence & Data Science)

(Semester I-II)

Examinations: 2022-2025

P.G. Department of Computer Science & Applications

Khalsa College, Amritsar

Programme name: B.Sc. (Artificial Intelligence & Data Science)
Programme code: BAIDS
Programme Duration :3 years

Programme Objectives

1.	The main objective of this Programme is to enable the students to get a very good exposure to the field of artificial intelligence and data science.
2.	This Programme aims to equip the students with statistical and mathematical reasoning, machine learning to develop their own customized data science algorithms needed for deriving insights from very large data sets.
3.	To prepare students with the skills to perform intelligent data analysis that is a key component in numerous real-world applications.
4.	Expertized with the principles of Artificial Intelligence and problem solving, inference, perception, knowledge representation, and machine learning.
5.	To exhibit high standards with regard to application of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.

Programme Specific Outcomes (PSOs):

PSO-1.	Students gain knowledge in the areas like Soft Computing, Artificial Intelligence, Data Science, Paradigm of Programming language, Design and Analysis of Algorithms, Database Technologies core computing subjects.
PSO-2.	Students understand all dimensions of the concepts of software application and projects.
PSO-3.	To make students employable according to current demand of Data Science & Artificial Intelligence Industry.
PSO-4.	Work in a collaborative manner with others on a team, contributing to the management, planning and implementation of a computer system.

B.Sc. (Artificial Intelligence & Data Science)

Semester – I

Sr. No.	Paper	Paper Name	Marks				Page No.
			Theory	Practical	Internal	Total	
1	BAIDS-111	Basics of AI & Data Science	**56**		**19**	**75**	**406-407**
2	BAIDS-112	Computational Problem-Solving Using Python	**56**		**19**	**75**	**408-409**
3	BAIDS-113	Big Data Analytics	**56**		**19**	**75**	**410-411**
4	BCSE-1122	Communication Skills in English	**37**		**13**	**50**	**412-413**
5	BHPB-1101/BPBI1102 /BPHC-1104	Punjabi/Basic Punjabi (Mudhli Punjabi) (Compulsory)/ Punjab History & Culture	**37**		**13**	**50**	**414-417**
6	BAIDS-114P	LAB I: Computational Problem-Solving Using Python		**30**	**10**	**40**	**418-419**
7	BAIDS-115P	Lab II: MS Office 2010/Open Office		**26**	**09**	**35**	**420-421**
8	ZDA111	*Drug Abuse: Problem, Management and Prevention(Compulsory Paper)	**37**		**13**	**50**	**422-424**
					Total Marks=	**400**	

- **Marks of Paper-VIII will not be included in the Total Marks**

B.Sc. (Artificial Intelligence & Data Science)
Semester – I
BAIDS-111: Basics of AI & Data Science

Time: 3 Hours **M. Marks: 75**
Credit Hours (per week):4 **Theory Marks: 56**
Total Hours:60 **Theory Internal Assessment Marks: 19**

Note: 1. Medium of Examination is English Language.
(B) The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from UniT-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks**.

Course Objectives:

The main objective of this course is to help the students to understand the basic concepts of artificial intelligence and data science.

UNIT-I

Introduction to Artificial Intelligence: Definition of AI, History of AI, Intelligent Agents, Different types of agents, Problem solving.
Uninformed Search: Breadth First Search, Depth First Search, Depth-Limited Search, Iterative Deepening search.
Heuristic Search technologies: Introduction to heuristic search, Generate and test, Hill Climbing, Best First search, A*, Problem reduction, AO*, Constraint satisfaction.
Knowledge, Reasoning and Planning: Logical Agents, Classical Planning, A brief introduction to Knowledge representation and Reasoning.
Learning: Learning from examples, Knowledge in learning.
Communicating, perceiving, and Acting: Communication, Natural Language Processing, Perception, Robotics

UNIT-II

Introduction to Data Science: Need for Data Science, Benefits of Data Science, Foundation of Data Science, Data Science process.

Data Exploration and Preparation: Messy data, Anomalies and artefacts in datasets, Cleaning data.

Data Representation and Transformation: Forms of data- tabular, text data, graph-based data, Modern databases- text files, spreadsheets, SQL databases, NoSQL databases, distributed databases, live data streams.

Data modelling: Basics of Generative 407odelling and Predictive 407odelling.

Data Visualization and Presentation: Charts-histograms, scatter plots, time series plots etc, Graphs, 3D Visualization, and Presentation.

References:

1. S.J. Russell and P. Norvig, "Artificial Intelligence: A Modern Approach", Pearson.
2. Rich Elaine, Knight Kevin, and Shankar B. Nair, "Artificial Intelligence, Third Edition, Tata-McGraw Hill.
3. Sinan Ozdemir: "Principles of Data Science", Pack Publishing.
4. Foster Provost and Tom Fawcett, "Data Science for Business" O'Reilly.
5. Roger D. Peng & Elizabeth Matsui: "The Art of Data Science" Lean Publishing.

Course Outcomes (Cos):

On the completion of this course, the students will be able:

CO-1.	To familiarize with the concept of artificial intelligence, intelligent agents and different searching techniques.
CO-2.	To understand the basic areas of artificial intelligence including knowledge representation, reasoning, learning, natural language processing, and robotics.
CO-3.	To understand the different needs and benefits of data science.
CO-4.	To acquire the knowledge of preprocessing techniques which are required for the conversion of raw data to the form helpful for further analysis.
CO-5.	To acquire in-depth knowledge about the different methods of data representation and data visualization.

B.Sc. (Artificial Intelligence & Data Science)

Semester – I

BAIDS-112: Computational Problem-Solving Using Python

Time: 3 Hours **M. Marks: 75**

Credit Hours (per week):4 **Theory Marks: 56**

Total Hours:60 **Theory Internal Assessment Marks: 19**

Note: 1. Medium of Examination is English Language.

(C) The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks.**

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks**.

Course Objectives:

1.	Demonstrate the ability to solve problems using system approaches, critical and innovative thinking, and technology to create solutions.
2.	Understand the purpose and technology to create solutions.
3.	Create scripts in Python.
4.	Design and develop applications using Python.

UNIT I

Python Introduction: Installing and setting Python environment in Windows and Linux, basics of Python interpreter, Execution of python program, Editor for Python code, syntax, variable, types.

Flow control: if, if-else, for, while, range function, continue, pass, break. Strings: Sequence operations, String Methods, Pattern Matching.

Lists: Basic Operations, Iteration, Indexing, Slicing and Matrixes; Dictionaries: Basic dictionary operations; Tuples and Files.

Functions: Definition, Call, Arguments, Scope rules and Name resolution; Modules: Module Coding Basics, Importing Programs as Modules, Executing Modules as Scripts, Compiled Python files(.pyc).

UNIT II

Standard Modules: OS and SYS, The dir() Function, Packages.

Input output and file handling, Object Oriented Programming features in Python: Classes, Objects, Inheritance, Operator Overloading.

Errors and Exceptions: try, except and else statements, Exception Objects, Regular expressions, Multithreading, Modules to handle multidimensional data: Numpy, Panadas.

Networking: Socket module, Port Scanning, Packet Sniffing, Traffic Analysis, TCP Packet Injection, Log analysis. HTTP Communications with Python built in Libraries, Web communications with the Requests module.

Forensic Investigations with Python: geo-locating, recovering deleted items, examining metadata and windows registry.

References:

1 . Lutz Mark, (2009). Learning Python, Latest Edition., O'REILLY Media, Inc.

2. TJ. O'Connor, Violent Python A Cookbook for Hackers, Forensic Analysts, Penetration Testers and Security Engineers(2013), Elsevier.

3. Seitz Justin , (2009). Gray Hat Python: Python Programming with Hackers and Reverse Engineers, Latest Edition, No Starch Press, Inc.

4. Seitz Justin , (2015). Black Hat Python: Python Programming for Hackers and Pentesters, Latest Edition, No Starch Press, Inc

5. Berry Paul, (2011). Head First Python. Latest Edition, O'REILLY Media, Inc.

Course Outcomes:

At the end of this course student will be able to:

CO-1.	Describe the core syntax and semantics of Python programming language.
CO-2.	Discover the need for working with the strings and functions.
CO-3.	Illustrate the process of structuring the data using lists and dictionaries.
CO-4.	Infer the Object-oriented Programming concepts in Python.
CO-5.	To develop the ability to write database applications in Python.

B.Sc. (Artificial Intelligence & Data Science)
Semester – I
BAIDS-113: Big Data Analytics

Time: 3 Hours **M. Marks: 75**
Credit Hours (per week):4 **Theory Marks: 56**
Total Hours: 60 **Theory Internal Assessment Marks: 19**

Note: 1. Medium of Examination is English Language.

(D) The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks.**

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks**.

Course Objectives:

1.	The Major objective is to optimize business decisions and create competitive advantage with Big Data analytics.
2.	This course provides an overview of Big Data, i.e. storage, retrieval and processing of big data.
3.	It also helps to use various techniques for mining data stream in with reference to big data.
4.	Provide an overview of Apache Hadoop along with understanding of Map Reduce Job.
5.	Exposure to Data Analytics with R Programming Language.

UNIT-I

INTRODUCTION TO BIG DATA: Data Storage and Analysis, Characteristics of Big Data, Evolution of Big Data, Definition of Big Data, Challenges with Big Data,3Vs of Big Data,

Business Intelligence vs. Big Data. Big Data Analytics: Classification of analytics, Data Science Terminologies in Big Data, CAP Theorem, BASE Concept.

BASICS OF HDFS (Hadoop Distributed File System): History of Hadoop, Requirement of Hadoop Framework, Design principles of Hadoop, Comparison with other system, Hadoop Distributed File System, Components of Hadoop, Analysing the Data with Hadoop, Command Line Interface, Hadoop file system interfaces, Data flow, Data Ingest with Flume.

Map Reduce: Introduction to Map Reduce, Anatomy of a Map Reduce Job Run, Job Failures, Job Scheduling, Shuffle and Sort, Task Execution, Map Reduce Types and Formats, Map Reduce Features.

UNIT-II

Hadoop Ecosystems: Hive Architecture, Data type, File format, Hive Shell, Hive Services, Hive Meta store, Comparison with Traditional Databases, HiveQL, Tables, Querying Data and User Defined Functions.

Introduction to R Language: Exploratory Data Analytics-Statistical methods for evaluation Hadoop & Map Reduce framework for R, R with Relational Database Management Systems, R with Non-Relational (NoSQL) DBs.

References:

1. Tom White " Hadoop: The Definitive Guide" Third Edition, O'reily Media, 2012.
2. Seema Acharya, Subhasini Chellappan, "Big Data Analytics" Wiley 2015.
3. Tom White, "Hadoop: The Definitive Guide",O'Reilly,4th Edition,2015.
4. Donald Miner, Adam Shook, "Map Reduce Design Pattern", O'Reilly, 2012
5. Simon Walkowiak, "Big Data Analytics with R" Packet Publishers, 2016

Course Outcomes:

After successful completion of this course, the students will be able to:

CO-1	Understand Big Data and its analytics in the real world.
CO-2	Access and Process Data on Distributed File System using various jobs in Hadoop.
CO-3	Design of Algorithms to solve Data Intensive Problems using Map Reduce Paradigm.
C0-4	Implement Big Data Activities using Hive.
CO-5	Use of R programming language for implementing Machine Learning Techniques.

B.Sc. (Artificial Intelligence & Data Science)

Semester – I

BCSE-1122: COMMUNICATION SKILLS IN ENGLISH

Time: 3 Hours **Max. Marks: 50**
Credit Hours (per week):4 **Theory Marks: 37**
Internal assessment: 13
Lectures /week: 6

Suggested Pattern of Question Paper:

The question paper will consist of Seven skill–oriented questions from Reading and Writing Skills. The first 6 Questions carry 5 marks each. The 7th Question carries 7 marks. The questions shall be phrased in a manner that students know clearly what is expected of them. There will be internal choice wherever possible.

viii) Comprehension questions of an unseen passage.
ix) Personal letter Official/Business letters.
x) Writing notices/agenda/resolution/ minutes for public circulation on topics of professional interest
xi) Writing resume or converting a biographical note into resume
xii) Writing news report based on a given heading
xiii) Do as directed
Articles Units 69-81
Conjunctions Units 113-120 (6X5=30 Marks)
xiv) Translation from English to Vernacular (Punjabi/ Hindi) (Isolated Sentences) (1X7=7 Marks)

Course Objectives:

1. Effective Communication skills are about conveying our message to others clearly.
2. It engages the choice and use of an effective channel and presentation of information to the target audience.
3. The main objective is to articulate the inner thoughts in a more channelized manner.
4. The mutual understanding of our needs, wishes, hopes.

Course Contents:

(E) **Reading Skills**: Reading tactics and strategies; Reading purposes–kinds of purposes and associated comprehension; Reading for direct meanings; Reading for understanding concepts, details, coherence, logical progression and meanings of phrases/ expressions.

Activities:

g) Active reading of passages on general topics
h) Reading newspaper, articles, editorials etc.
i) Short questions based on content and development of ideas of a given paragraph.

(F) **Writing Skills**: Guidelines for effective writing; writing styles for application, resume, personal letter, official/ business letter, memo, notices etc.

Activities:

k) Personal and business letters.

l) Converting a biographical note into a sequenced resume.
m) Writing notices for circulation/ boards.
n) Making notes of given passage with headings and sub-headings
o) Writing newspaper reports based on given heading.

References:

Murphy's English Grammar **(by Raymond Murphy) CUP**

References:

1. *Oxford Guide to Effective Writing and Speaking* by John Seely.
2. The Written Word by Vandana R Singh, Oxford University Press

Course Outcomes:

CO-5. One is point of view is understood by others.

CO-6. The main outcome is to socialize and be in touch with the community

CO-7. It enhances and develops the two way processes which is helpful to establish healthy relationship among the speakers and the listeners

CO-8. People are persuaded and dissuaded from doing different things.

B.Sc. (Artificial Intelligence & Data Science)

Semester – I

BHPB-1101: **ਲਾਜ਼ਮੀ ਪੰਜਾਬੀ**

ਸਮਾਂ : 3 ਘਮਟੇ ਕ੍ਰੈਡਿਟ ਪ੍ਰਤੀ ਹਫਤਾ : 04

ਕੁੱਲ ਘਮਟੇ : 60 ਥਿਊਰੀ ਅਮਕ : 37, ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ : 13, ਕੁੱਲ ਅਮਕ : 50

ਅਮਕ-ਵੰਡ ਅਤੇ ਪ੍ਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

- ਸਿਲੇਬਸ ਦੇ ਚਾਰ ਭਾਗ ਹਨ ਪਰ ਪ੍ਰਸ਼ਨ-ਪੱਤਰ ਦੇ ਪੰਜ ਭਾਗ ਹੋਣਗੇ। ਪਹਿਲੇ ਚਾਰ ਭਾਗਾਂ ਵਿਚ 02-02 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰੇਕ ਭਾਗ ਵਿਚੋਂ 01-01 ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਲਾਜ਼ਮੀ ਹੋਵੇਗਾ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ (08) ਅਮਕ ਹੋਣਗੇ। ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਪੰਜਵੇਂ ਭਾਗ ਵਿਚ ਸਾਰੇ ਸਿਲੇਬਸ ਵਿਚੋਂ 01-01 ਅਮਕ ਦੇ ਛੇ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ, ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ 05 ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ ਦੇਣਾ ਲਾਜ਼ਮੀ ਹੋਵੇਗਾ। ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ-ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।
  ਨੋਟ: ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ 13 ਅਮਕਾਂ ਦੀ ਹੈ, ਜੋ ਕਾਲਜ ਵੱਲੋਂ ਨਿਰਧਾਰਿਤ ਦਿਸ਼ਾ ਨਿਰਦੇਸ਼ਾਂ ਅਨੁਸਾਰ ਥਿਊਰੀ ਅਮਕਾਂ ਤੋਂ ਵੱਖਰੀ ਹੋਵੇਗੀ। ਇਸ ਪੇਪਰ ਦੇ ਕੁੱਲ ਅਮਕ 37+13 = 50 ਹਨ।

ਕੋਰਸ ਦਾ ਉਦੇਸ਼ Course Objective

- ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਸਾਹਿਤਕ ਰੁਚੀਆਂ ਪੈਦਾ ਕਰਨਾ।
- ਆਲੋਚਨਾਤਮਕ ਰੁਚੀਆਂ ਵਿਕਸਤ ਕਰਨਾ।
- ਮਾਤ ਭਾਸ਼ਾ ਦੀ ਸਮਝ ਨੂੰ ਵਿਕਸਤ ਕਰਨਾ

ਪਾਠ-ਕ੍ਰਮ ਨਤੀਜੇ Course Outcomes (Cos)

- ਵਿਦਿਆਰਥੀ ਦੀ ਸਾਹਿਤਕ ਸੋਚ-ਸਮਝ ਵਿਕਸਤ ਹੋਵੇਗੀ।
- ਉਸ ਵਿਚ ਸਾਹਿਤ ਰੁਚੀਆਂ ਵਿਕਸਤ ਹੋਣਗੀਆਂ।
- ਉਸ ਵਿਚ ਸਾਹਿਤ ਸਿਰਜਣਾ ਦੀ ਸੰਭਾਵਨਾ ਵਧੇਗੀ।
- ਉਹ ਕਿਸੇ ਵੀ ਵਿਸ਼ੇ ਦਾ ਗਹਿਨ ਅਧਿਐਨ ਕਰਨ ਦੇ ਕਾਬਲ ਹੋਵੇਗਾ।
- ਉਹ ਮਾਤ ਭਾਸ਼ਾ ਦੇ ਵਿਕਾਸ ਵਿਚ ਵਿਸ਼ੇਸ ਯੋਗਦਾਨ ਪਾਉਣਗੇ।

ਪਾਠ-ਕ੍ਰਮ

ਭਾਗ-ਪਹਿਲਾ

ਸਾਹਿਤ ਦੇ ਰੰਗ, ਡਾ. ਹਿਲ ਸਿੰਘ (ਸੰਪਾ.), ਰਵੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅਮਮ੍ਰਿਤਸਰ।
ਭਾਗ ਪਹਿਲਾ – ਕਵਿਤਾ ਅਤੇ ਕਹਾਣੀ, ਡਾ. ਹਿਲ ਸਿੰਘ ਅਤੇ ਡਾ. ਆਤਮ ਰੰਧਾਵਾ (ਸਹਿ ਸੰਪਾ.)
(ਕਵਿਤਾ ਭਾਗ ਵਿਚੋਂ ਪ੍ਰਸੰਗ ਸਹਿਤ ਵਿਆਖਿਆ/ਵਿਸ਼ਾ-ਵਸਤੂ। ਕਹਾਣੀ ਭਾਗ ਵਿਚੋਂ ਸਾਰ/ਵਿਸ਼ਾ-ਵਸਤੂ)

ਭਾਗ-ਦੂਜਾ

ਇਤਿਹਾਸਿਕ ਯਾਦਾਂ
ਸ. ਸ. ਅਮੋਲ (ਸੰਪਾ.), ਪੰਜਾਬੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅਮਮ੍ਰਿਤਸਰ।
(ਨਿਬੰਧ 1 ਤੋਂ 6 ਤਕ ਸਾਰ/ ਵਿਸ਼ਾ-ਵਸਤੂ/ਸ਼ੈਲੀ)

ਭਾਗ-ਤੀਜਾ

(ੳ) ਪੈਰ੍ਹਾ ਰਚਨਾ (ਤਿੰਨਾਂ ਵਿਚੋਂ ਇਕ)
(ਅ) ਪੈਰ੍ਹਾ ਪੜ੍ਹ ਕੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ

ਭਾਗ-ਚੌਥਾ

ਭਾਸ਼ਾ ਵੰਨਗੀਆਂ : ਭਾਸ਼ਾ ਦਾ ਟਕਸਾਲੀ ਰੂਪ, ਭਾਸ਼ਾ ਅਤੇ ਉਪ-ਭਾਸ਼ਾ ਵਿਚਲਾ ਅਮਤਰ, ਪੰਜਾਬੀ ਉਪ-ਭਾਸ਼ਾਵਾਂ ਦੇ ਪਛਾਣ-ਚਿੰਨ੍ਹ
ਪੰਜਾਬੀ ਭਾਸ਼ਾ : ਨਿਕਾਸ ਤੇ ਵਿਕਾਸ

B.Sc. (Artificial Intelligence & Data Science)
Semester – I
BPBI-1102:ਮੁਢਲੀ ਪੰਜਾਬੀ
(In Lieu of Compulsory Punjabi)

ਸਮਾਂ : 3 ਘਮਟੇ ਕ੍ਰੈਡਿਟ ਪ੍ਰਤੀ ਹਫਤਾ : 04
ਕੁੱਲ ਘਮਟੇ : 60 ਥਿਊਰੀ ਅਮਕ : 37, ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ : 13, ਕੁੱਲ ਅਮਕ : 50

ਅਮਕ-ਵੰਡ ਅਤੇ ਪ੍ਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

- ਪਹਿਲੇ ਭਾਗ ਵਿਚੋਂ ਚਾਰ ਵਰਣਨਾਤਮਕ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਤਿੰਨ ਪ੍ਰਸ਼ਨਾਂ ਦਾ ਉੱਤਰ ਦੇਣਾ ਲਾਜ਼ਮੀ ਹੈ। ਹਰ ਪ੍ਰਸ਼ਨ ਦੇ ਚਾਰ-ਚਾਰ ਅਮਕ ਹਨ। ਭਾਗ ਦੂਸਰਾ ਵਿਚੋਂ ਦੋ-ਦੋ ਅਮਕ ਦੇ ਪੰਜ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਸਾਰੇ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹਨ। ਭਾਗ ਤੀਸਰਾ ਵਿਚੋਂ ਤਿੰਨ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਲਾਜ਼ਮੀ ਹਨ ਜਿਨ੍ਹਾਂ ਦੇ ਪੰਜ-ਪੰਜ ਅਮਕ ਹਨ। ਭਾਗ ਚੌਥਾ ਵਿਚ ਪੰਜ ਅਸ਼ੁੱਧ ਸ਼ਬਦਾਂ ਨੂੰ ਸ਼ੁੱਧ ਕਰਕੇ ਲਿਖਣਾ ਹੋਵੇਗਾ।

ਨੋਟ: ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ 13 ਅਮਕਾਂ ਦੀ ਹੈ, ਜੋ ਕਾਲਜ ਵੱਲੋਂ ਨਿਰਧਾਰਿਤ ਦਿਸ਼ਾ ਨਿਰਦੇਸ਼ਾਂ ਅਨੁਸਾਰ ਥਿਊਰੀ ਅਮਕਾਂ ਤੋਂ ਵੱਖਰੀ ਹੋਵੇਗੀ। ਇਸ ਪੇਪਰ ਦੇ ਕੁਲ ਅੰਕ 37+13 = 50 ਹਨ।

ਕੋਰਸ ਦਾ ਉਦੇਸ਼ Course Objective

- ਵਿਦਿਆਰਥੀ ਨੂੰ ਸ਼ੁੱਧ ਪੰਜਾਬੀ ਪੜ੍ਹਨਾ-ਲਿਖਣਾ ਸਿਖਾਉਣਾ।
- ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੀਆਂ ਵਿਆਕਰਨਕ ਬਾਰੀਕੀਆਂ ਤੋਂ ਜਾਣੂ ਕਰਾਉਣਾ।
- ਸ਼ੁੱਧ ਸੰਚਾਰ ਨੂੰ ਵਿਕਸਤ ਕਰਨਾ।

ਪਾਠ-ਕ੍ਰਮ ਨਤੀਜੇ Course Outcomes (COs)

- ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਅਤੇ ਗੁਰਮੁਖੀ ਲਿਪੀ ਦੀ ਸਿਖਲਾਈ ਵਿਚ ਮੁਹਾਰਤ ਹਾਸਿਲ ਕਰਨਗੇ।
- ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਵਿਚ ਮੁਹਾਰਨੀ, ਲਗਾਂ-ਮਾਤਰਾਂ, ਸਵਰ ਅਤੇ ਵਿਅੰਜਨ ਦੀ ਪਛਾਣ ਅਤੇ ਵਰਤੋਂ ਦੁਆਰਾ ਉਨ੍ਹਾਂ ਦੀ ਸਮਝ ਨੂੰ ਵਿਕਸਿਤ ਹੋਵੇਗੀ।
- ਪੰਜਾਬੀ ਸ਼ਬਦ-ਜੋੜਾਂ ਦੀ ਜਾਣਕਾਰੀ ਹਾਸਿਲ ਕਰਕੇ ਉਹ ਸ਼ੁੱਧ ਪੰਜਾਬੀ ਲਿਖਣ-ਪੜ੍ਹਨ ਦੇ ਸਮਰੱਥ ਹੋਣਗੇ।
- ਉਹ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੇ ਵਿਆਕਰਨ ਪ੍ਰਬੰਧ ਦੀ ਜਾਣਕਾਰੀ ਹਾਸਿਲ ਕਰਨਗੇ।

ਪਾਠ-ਕ੍ਰਮ

ਭਾਗ-ਪਹਿਲਾ

(ਓ) ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਤੇ ਗੁਰਮੁਖੀ ਲਿਪੀ :

ਨਾਮਕਰਣ ਤੇ ਸੰਖੇਪ ਜਾਣ-ਪਛਾਣ: ਗੁਰਮੁਖੀ ਵਰਣਮਾਲਾ, ਅੱਖਰ ਕ੍ਰਮ, ਸਵਰ ਵਾਹਕ (ਓ, ਅ, ੲ), ਲਗਾਂ-ਮਾਤਰਾਂ, ਪੈਰ ਵਿਚ ਬਿੰਦੀ ਵਾਲੇ ਵਰਨ, ਪੈਰ ਵਿਚ ਪੈਣ ਵਾਲੇ ਵਰਨ, ਬਿੰਦੀ, ਟਿੱਪੀ, ਅੱਧਕ

(ਅ) ਸਿਖਲਾਈ ਤੇ ਅਭਿਆਸ

ਭਾਗ-ਦੂਜਾ

ਗੁਰਮੁਖੀ ਆਰਥੋਗਰਾਫੀ ਅਤੇ ਉਚਾਰਨ :

ਸਵਰ, ਵਿਅੰਜਨ : ਮੁਢਲੀ ਜਾਣ-ਪਛਾਣ ਅਤੇ ਉਚਾਰਨ, ਮੁਹਾਰਨੀ, ਲਗਾਂ-ਮਾਤਰਾਂ ਦੀ ਪਛਾਣ

ਭਾਗ-ਤੀਜਾ

ਪੰਜਾਬੀ ਸ਼ਬਦ-ਜੋੜ : ਮੁਕਤਾ (ਦੋ ਅੱਖਰਾਂ ਵਾਲੇ ਸ਼ਬਦ, ਤਿੰਨ ਅੱਖਰਾਂ ਵਾਲੇ ਸ਼ਬਦ), ਸਿਹਾਰੀ ਵਾਲੇ ਸ਼ਬਦ, ਬਿਹਾਰੀ ਵਾਲੇ ਸ਼ਬਦ, ਔਂਕੜ ਵਾਲੇ ਸ਼ਬਦ, ਦੁਲੈਂਕੜ ਵਾਲੇ ਸ਼ਬਦ, ਲਾਂ ਵਾਲੇ ਸ਼ਬਦ, ਦੁਲਾਵਾਂ ਵਾਲੇ ਸ਼ਬਦ, ਹੋੜੇ ਵਾਲੇ ਸ਼ਬਦ, ਕਨੌੜੇ ਵਾਲੇ ਸ਼ਬਦ, ਲਗਾਖਰ (ਬਿੰਦੀ, ਟਿੱਪੀ, ਅੱਧਕ) ਵਾਲੇ ਸ਼ਬਦ

ਭਾਗ-ਚੌਥਾ

ਸ਼ੁੱਧ-ਅਸ਼ੁੱਧ ਸ਼ਬਦ

B.Sc. (Artificial Intelligence & Data Science)
Semester – I
BPHC-1104: PUNJAB HISTORY & CULTURE (From Earliest Times to C 320)
(Special Paper in lieu of Punjabi compulsory)
(For those students who are not domicile of Punjab)

Time: 3 Hours **Total. Marks: 50**
Credit Hours (per week):4 **Theory: 37**
Total Hours:60 **Internal Assessment: 13**

Instructions for the Paper Setter:
The question paper consists of five units: I, II, III, IV and V. Units I, II, III and IV will have two questions each. Each question carries 8 marks. The students are to attempt one question from each unit approximately in 800 words. Unit-V consists of 7 short answer type questions to be set from the entire syllabus. Students are to attempt any 5 questions in about 20 words each. Each question carries 1 mark.

Note: The examiner is to set the question paper in two languages: English & Hindi.

Course Objectives:

1.	The main objective of this course is to educate the history and culture of the Ancient Punjab to the students who are not domicile of the Punjab.
2.	It aims to familiarize these students with the physical features of ancient Punjab and its impact on its history and culture.
3.	It also provides them information about the different sources to construct the history and culture of the ancient Punjab.
4.	The course intends to provide knowledge of social, economic, religious life of the Harrapan civilization, Indo-Aryans, teachings and impact of Jainism and Buddhism in the Punjab

Unit-I

1. Physical features of the Punjab and impact on history.
2. Sources of the ancient history of Punjab.

Unit-II

3. Harappan Civilization: Town planning; social, economic and religious life of the Indus Valley People.
4. The Indo-Aryans: Original home and settlement in Punjab.

Unit-III

5. Social, Religious and Economic life during Rig Vedic Age.
6. Social, Religious and Economic life during later Vedic Age.

Unit-IV

7. Teachings and impact of Buddhism.
8. Jainism in the Punjab.

Books Prescribed:-

1. L. Joshi (ed), History and Culture of the Punjab, Art-I, Patiala, 1989 (3rd edition)
2. L.M. Joshi and Fauja Singh (ed), History of Punjab, Vol.I, Patiala 1977.
3. Budha Parkash, Glimpses of Ancient Punjab, Patiala, 1983.
4. B.N. Sharma, Life in Northern India, Delhi. 1966.

Course Outcomes:

After completion of the course, the students will be able to learn:

CO-1	The history and culture of the Ancient Punjab.
CO-2	Physical features of ancient Punjab.
CO-3	The sources of the history of the Punjab.
CO-4	Social, economic, religious life of the Harrapan civilization and Vedic-Aryans.
CO-5	Teachings and impact of Jainism and Buddhism in the Punjab.

B.Sc. (Artificial Intelligence & Data Science)

Semester – I

BAIDS-114P (Practical)

LAB I: Computational Problem-Solving Using Python

Credit Hours (per week):4 **Max. Marks: 40**

Total Hours:60 **Practical Marks: 30**

Practical Internal Assessment Marks: 10

Course Objectives:

Enable the student to

1.	Understand the basics of python programming concepts.
2.	Develop programs using object-oriented features, graphical user interfaces and image processing
3.	Understand the high-performance programs designed to build up the real proficiency.

In Computational Problem-Solving Using Python Lab student implements the following Topics:

1. Python program to print "Hello Python".
2. Python program to swap two variables
3. Python program to generate a random number
4. Python program to convert kilometres to miles.
5. Python Program to Check Prime Number
6. Python Program to Print all Prime Numbers in an Interval
7. Python Program to Find the Factorial of a Number
8. Python Program to Check Armstrong Number
9. Python Program to Find LCM
10. Python Program to Find HCF
11. Python Program to Convert Decimal to Binary, Octal and Hexadecimal
12. Python Program To Find ASCII value of a character
13. Python Program to Make a Simple Calculator
14. Python Program to Display Calendar
15. Python program to check if the given number is a Disarium Number
16. Python program to print all disarium numbers between 1 to 100.
17. Python program to print the elements of an array in reverse order
18. Python program to print the elements of an array present on even position

19. Python program to print the elements of an array present on odd position
20. Python program to print the largest element in an array

Course Outcomes:

Students will be able to

CO-1.	Describe the Control statement, String, List, and Dictionaries in Python.
CO-2.	Understand the different types of function and File handling operations.
CO-3.	Interpret Object oriented programming in Python
CO-4.	Build the interactive python application using GUI.
CO-5.	Develop a multithreading and network application.

B.Sc. (Artificial Intelligence & Data Science) Semester – I

BAIDS-115P (Practical)

Lab II: MS Office 2010/Open Office

Credit Hours (per week):4 **Max. Marks: 35**

Practical Marks: 26

Practical Internal Assessment Marks: 09

Course Objectives:

Enable the student to

1. To be proficient in office automation applications.
2. Handle the word processing software.
3. Understand that in In Today's commercial world, automation helps the users with a sophisticated set of commands to format, edit, and print text documents.
4. Use it as valuable and important tools in the creation of applications such as newsletters, brochures, charts, presentation, documents, drawings and graphic images.

MS Office 2010/Open Office

MS–Word 2010:

1. Introduction to Parts of Word Window
2. Creating New Documents, Saving Documents, Opening an Existing documents, insert a second document into an open document, Editing and formatting in document.
3. Page Setup
4. Headers and Footers
5. Creating a Table Using the Table Menu and table formatting
6. Borders and Shading
7. Spell Checking
8. Mail Merge.

MS Power Point 2010:

1. Power point elements Templates, Wizards, Views, Exploring Power Point Menu
2. Working with Dialog Boxes, Adding Text, Adding Title, Moving Text Area, Resizing Text Boxes
3. Adding Art, Starting a New Slide, Starting Slide Show, Saving presentation.
4. Printing Slides
5. Views (View slide sorter view, notes view, outlines view)
6. Formatting and enhancing text formatting
7. Creating Graphs (Displaying slide show and adding multi–media)

MS Excel 2010:

1. Spreadsheet Components: The Excel Environment Excel Window Components Enhanced ScreenTips , Examining Excel Window Components
2. Getting Help The Excel Help Window , Getting Help with Using Excel
3. Navigating a Worksheet Navigation Methods , Navigating a Worksheet
4. Entering and Editing Data, Editing Cell Contents Using AutoFill
5. Entering and Editing Formulas, Creating a Basic Formula
6. Working with Pictures Add an Image to a Worksheet
7. Saving and Updating Workbooks
8. Entering a SUM Function , AutoSum , AVERAGE Function , MIN MAX Function COUNT and COUNTA.

Course Outcomes:

The student will be able to

CO-1.	Use word processors, spreadsheets, presentation software.
CO-2.	Describe the features and functions of the categories of application software.
CO-3.	Understand the dynamics of an office environment.
CO-4.	Demonstrate the ability to apply application software in an office environment.

B.Sc. (Artificial Intelligence & Data Science)

Semester – I

ZDA111: Drug Abuse: Problem, Management and Prevention

PROBLEM OF DRUG ABUSE

(Compulsory for all Under Graduate Classes)

Credit Hours (per week): 1.5 hrs.

Total Hours: 22.5 hrs.

Max. Marks: 50

Instructions for the Paper Setters:

Section–A: (15 Marks): It will consist of five short answer type questions. Candidates will be required to attempt three questions, each question carrying 05 marks. Answer to any of the questions should not exceed two pages.

Section–B: (20 Marks) It will consist of four essay type questions. Candidates will be required to attempt two questions, each question carrying 10 marks. Answer to any of the questions should not exceed four pages.

Section–C: (15 Marks) It will consist of two questions. Candidate will be required to attempt one question only. Answer to the question should not exceed 5 pages.

Course Objectives

The course aims to:

CO-1.	Generate the awareness against drug abuse.
CO-2.	Describe a variety of models and theories of addiction and other problems related to substance abuse.
CO-3.	Describe the behavioral, psychological, physical health and social impact of psychoactive substances.
CO-4.	Provide culturally relevant formal and informal education programs that raise awareness and support for substance abuse prevention and the recovery process.
CO-5.	Describe factors that increase likelihood for an individual, community or group to be at risk of substance use disorders.

UNIT–I

- **Meaning of Drug Abuse**

  Meaning, Nature and Extent of Drug Abuse in India and Punjab.

UNIT-II

- **Consequences of Drug Abuse for:**

  Individual : Education, Employment and Income.

  Family : Violence.

Society : Crime.

Nation : Law and Order problem.

UNIT-III

- **Management of Drug Abuse**

  Medical Management: Medication for treatment and to reduce withdrawal effects.

UNIT-IV

- Psychiatric Management: Counseling, Behavioral and Cognitive therapy.
- Social Management: Family, Group therapy and Environmental Intervention.

References:

1. Ahuja, Ram (2003), Social Problems in India, Rawat Publication, Jaipur.
2. Extent, Pattern and Trend of Drug Use in India, Ministry of Social Justice and Empowerment, Government of India, 2004.
3. Inciardi, J.A. 1981. The Drug Crime Connection. Beverly Hills: Sage Publications. 23
4. Jasjit Kaur Randhawa & Samreet Randhawa, "Drug Abuse-Problem, Management & Prevention", KLS, ISBN No. 978-81-936570-6-5, (2018).
5. Jasjit Kaur Randhawa & Samreet Randhawa, "Drug Abuse Problem, Management & Prevention", KLS, ISBN No. 978-81-936570-8-9, (2019).
6. Jasjit Kaur Randhawa & Samreet Randhawa, "ਡਰੱਗਜ਼ ਦੁਰਵਰਤੋਂ-(ਨਸ਼ਾਖੋਰੀ) ਸਮੱਸਿਆ, ਪ੍ਰਬੰਧਨ ਅਤੇ ਰੋਕਥਾਮ", KLS, ISBN No. 978-81-936570-7-1, (2018).
7. Jasjit Kaur Randhawa, "Drug Abuse -Management & Prevention", KLS, ISBN No. 978-93-81278-80-2, (2018).
8. Kapoor. T. (1985) Drug epidemic among Indian Youth, New Delhi: Mittal Pub.
9. Modi, Ishwar and Modi, Shalini (1997) Drugs: Addiction and Prevention, Jaipur: Rawat Publication.
10. National Household Survey of Alcohol and Drug abuse. (2003) New Delhi, Clinical Epidemiological Unit, All India Institute of Medical Sciences, 2004.
11. Rama Gandotra & Jasjit Kaur Randhawa, "ਡਰੱਗਜ਼ ਦੁਰਵਰਤੋਂ-(ਨਸ਼ਾਖੋਰੀ) ਪ੍ਰਬੰਧਨ ਅਤੇ ਰੋਕਥਾਮ", KLS, ISBN No. 978-93-81278-87-1, (2018).
12. Sain, Bhim 1991, Drug Addiction Alcoholism, Smoking obscenity New Delhi: Mittal Publications.

13. Sandhu, Ranvinder Singh, 2009, Drug Addiction in Punjab: A Sociological Study. Amritsar: Guru Nanak Dev University.
14. Singh, Chandra Paul 2000. Alcohol and Dependence among Industrial Workers: Delhi: Shipra.
15. Sussman, S and Ames, S.L. (2008). Drug Abuse: Concepts, Prevention and Cessation, Cambridge University Press.
16. World Drug Report 2010, United Nations office of Drug and Crime.
17. World Drug Report 2011, United Nations office of Drug and Crime.

Course Outcomes:

The students will be able:

CO-1.	To describe issues of cultural identity, ethnic background, age and gender in prevention, treatment and recovery.
CO-2.	To describe warning sign, symptoms, and the course of substance use disorders.
CO-3.	To describe principles and philosophy of prevention, treatment and recovery.
CO-4.	To describe current and evidenced-based approaches practiced in the field of addictions.

B.Sc. (Artificial Intelligence & Data Science)
Semester – II

Sr. No.	Paper	Paper Name	Marks				Page No.
			Theory	Practical	Internal	Total	
1	BAIDS-121	AI & Machine Learning	**56**		**19**	**75**	**426-427**
2	BAIDS-122	Data Warehousing & Data Mining	**56**		**19**	**75**	**428-429**
3	BAIDS-123	Data Structures	**56**		**19**	**75**	**430-431**
4	BCSE-1222	Communication Skills in English	**37**		**13**	**50**	**432-433**
5	BHPB-1201/BPBI-1102/BPHC-1204	Punjabi/Basic Punjabi (Mudhli Punjabi) (Compulsory)/ Punjab History & Culture	**37**		**13**	**50**	**434-437**
6	BAIDS-124P	LAB I: Data Structures Implementation using Python		**30**	**10**	**40**	**438-439**
7	BAIDS-125P	Lab II: Data Mining Algorithm implementation		**26**	**09**	**35**	**440**
8	ZDA121	*Drug Abuse: Problem, Management and Prevention(Compulsory Paper)	**37**		**13**	**50**	**441-443**
					Total Marks=	**400**	

- **Marks of Paper-VIII will not be included in the Total Marks**

B.Sc. (Artificial Intelligence & Data Science)
Semester – II
BAIDS-121: AI & Machine Learning

Time: 3 Hours **M. Marks: 75**
Credit Hours (per week):4 **Theory Marks: 56**
Total Hours: 60 **Theory Internal Assessment Marks: 19**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks.**

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks**.

Course Objectives:

1.	The main objective of this course is to introduce the field of artificial intelligence and machine learning.
2.	This course covers in detail the topics of knowledge representation, game playing and expert systems.
3.	Besides this, it also incorporated the state of art techniques of machine learning, i.e. supervised and non- supervised techniques which are quite useful nowadays for the classification and regression purposes.

UNIT-I

Introduction to Artificial Intelligence: Applications of AI and its importance.

Knowledge representation: Definition & importance of Knowledge, Knowledge acquisition and manipulation, Issues in knowledge representation, Knowledge representation methods - propositional logic and first order predicate logic, resolution principle, Horn's clauses, semantic networks, partitioned semantic nets, frames, scripts and conceptual dependencies.

Game playing: MiniMax search procedure, Reducing alternatives using Alpha-Beta pruning method examples.

Expert systems: Introduction, Examples, Characteristics architecture, People involved and their role in building an expert systems, Case studies of expert systems, MYCIN and DENDRAL; features of knowledge acquisition systems : MOLE and SALT.

UNIT-II

Introduction to Machine Learning: Introduction to Machine learning, Types: supervised learning and unsupervised learning, Applications of machine learning.

Basic Concepts of Learning Models and its performance Evaluation: Dimensionality reduction using Principal component analysis, a general view of feature extraction, Feature ranking, Validation techniques, Confusion matrix and its related performance parameters.

Supervised Learning algorithms: Back propagation neural network, Radial basis function neural network, Bayesian Network, Naive Bayes classifiers, Decision tree, Linear regression, Logistic regression.

Unsupervised Learning Algorithms: K-means Clustering, Hierarchical clustering

SVM& Ensemble Machine Learning models: Support Vector Machine (SVM), Fundamental concept of Ensemble Machine Learning techniques such as Bagging, Boosting.

Reinforcement Learning: Introduction to Reinforcement learning and its types.

References:

1. Rich Elaine and Knight Kevin Shiva Shankar B Nair, "Artificial Intelligence", Third Edition, Tata-McGraw Hill.
2. Stuart Russell and Peter Norvig, "Artificial intelligence a modern approach", Pearson.
3. Dan W. Patterson: Introduction to Artificial Intelligence and Expert Systems, Pearson Education.
4. E. Alpaydin, "Introduction to Machine Learning" Edition 2nd, MIT Press , 2009.

Course Outcomes (COs):

On the completion of this course, the students will

CO-1.	Obtain the knowledge of different areas where artificial intelligence has acquired an important place.
CO-2.	Understand the different methods involved in knowledge representation and game playing.
CO-3.	Understand the concept of expert system which are capable of emulating the decision-making ability of a human expert.
CO-4.	Understand the various supervised and non-supervised techniques helpful in the construction of learning models.
CO-5.	Understand the different performance evaluation measures helpful in appraising the developed learning models.

B.Sc. (Artificial Intelligence & Data Science)

Semester – II

BAIDS-122: Data Warehousing & Data Mining

Time: 3 Hours **M. Marks: 75**

Credit Hours (per week):4 **Theory Marks: 56**

Total Hours:60 **Theory Internal Assessment Marks: 19**

Note: 1. Medium of Examination is English Language.

2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks.**

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks**.

COURSE OBJECTIVES:

1.	Be familiar with mathematical foundations of data mining tools.
2.	Understand and implement classical models and algorithms in data warehouses and data mining
3.	Characterize the kinds of patterns that can be discovered by association rule mining, classification and clustering.
4.	Master data mining techniques in various applications like social, scientific and environmental context.
5.	Develop skills in selecting the appropriate data mining algorithm for solving practical problems

UNIT-I

Data Warehousing: Concepts of Data Warehousing, Difference between operational database systems and Data warehousing, Need of a separate Data Warehouse. Multidimensional Data Model.

Data Warehousing Architecture: Steps for Design and Construction of Data-Warehouses, Three-Tier Data Warehouse Architecture, Characteristics of Data Warehousing Data, Data Marts, Types of OLAP Servers: ROLAP, MOLAP, HOLAP; Difference between Online Transaction Processing and Online Analytical Processing

UNIT-II

Data Warehouse Implementation: Efficient Computation of Data Cubes, Indexing OLAP Data, Efficient Processing of OLAP Queries, Metadata Repository, Data Warehouse Back-End Tools and Utilities

Data Mining Basic Concepts; Data Mining Techniques: Predictive Modelling, Database Segmentation. Data Mining Query Languages, Applications and Trends in Data Mining.

References:

1. Han, Kamber*"Data Mining: Concepts and Techniques"* Morgan Kaufmann.
2. RomezElmasri, ShamkantB.Navathe, *"Fundamentals of Database Systems"* Pearson Education.
3. Silberschatz, Korth, Sudershan*"Database System Concepts"* 4th Ed. McGraw Hill
4. Connolly &Begg*"Database Systems – A Practical Approach to Design, Implementation and Management*", 3rd Ed., Pearson Education.

Course Outcomes:

C0-1	Understand the functionality of the various data mining and data warehousing component Knowledge.
C0-2	Understand and Appreciate the strengths and limitations of various data mining and data warehousing models
C0-3	Apply, Create and Explain the analysing techniques of various data
C0-4	Analyse and Describe different methodologies used in data mining and data ware housing.
C0-5	Evaluate and Analyse and Compare different approaches of data ware housing and data mining with various technologies.

B.Sc. (Artificial Intelligence & Data Science)
Semester – II
BAIDS-123: Data Structures

Time: 3 Hours **M. Marks: 75**
Credit Hours (per week):4 **Theory Marks: 56**
Total Hours:60 **Theory Internal Assessment Marks: 19**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks.**

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks**.

Course Objectives:

1.	The main objective of this course is to help students to understand the concept of organizing and managing data in computer's memory.
2.	Therefore, this course introduces different data structure techniques along with their representation in computer's memory.

UNIT – I

Introduction to Data Structures, abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks-Operations, array and linked representations of stacks, stack applications, Queues-operations, array and linked representations. Dictionaries: linear list representation, skip list representation, operations - insertion, deletion and searching. Hash Table Representation: hash functions, collision resolution-separate chaining, open addressing-linear probing, quadratic probing, double hashing, rehashing, extendible hashing.

UNIT – II

Search Trees: Binary Search Trees, Definition, Implementation, Operations- Searching, Insertion and Deletion, AVL Trees, Definition, Height of an AVL Tree, Operations – Insertion, Deletion and Searching, Red –Black, Splay Trees.

Graphs: Graph Implementation Methods. Graph Traversal Methods. Sorting: Heap Sort, External Sorting- Model for external sorting, Merge Sort.

Pattern Matching and Tries: Pattern matching algorithms-Brute force, the Boyer –Moore algorithm, the Knuth-Morris-Pratt algorithm, Standard Tries, Compressed Tries, Suffix tries.

References:

1. Fundamentals of Data Structures in C, 2nd Edition, E. Horowitz, S. Sahni and Susan Anderson Freed, Universities Press.
2. Data Structures using C – A. S. Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/Pearson Educ
3. Data Structures: A Pseudocode Approach with C, 2nd Edition, R. F. Gilberg and B.A. Forouzan, Cengage Learning.

Course Outcomes:

After the course completion, the students will be able to

CO-1.	Understand the concept of algorithm complexity and will acquire knowledge about mathematical notations which can be used to measure the algorithm's complexity.
CO-2.	Comprehend different data structure techniques, such as array, stacks, queue, linked
CO-3.	Apply linear search and binary search techniques in real word applications to identify the particular element.
CO-4.	Get knowledge about different sorting algorithms along with their time complexities.
CO-5.	List, trees, and graphs, along with the operations performed on them.
CO-6.	Understand the memory representation of the above-mentioned data structures.

B.Sc. (Artificial Intelligence & Data Science)

Semester – II

BCSE-1222: COMMUNICATION SKILLS IN ENGLISH

Time: 3 Hours **Max. Marks: 50**
Credit Hours (per week):4 **Theory Marks: 37**
Total Hours:60 **Internal Assessment: 13**

Suggested Pattern of Question Paper:
The question paper will consist of Seven skill–oriented questions from Listening and Speaking Skills. The first 6 Questions carry 5 marks each. The 7th Question carries 7 marks. The questions shall be phrased in a manner that students know clearly what is expected of them. There will be internal choice wherever possible.

1. Making summary/ précis or paraphrasing of an idea of a given passage.
2. Writing a paragraph of expository or argumentative nature of a given topic.
3. Interpretation of a given data, chart, diagram etc and making a brief report.
4. Transcoding (given dialogue to a prose or given prose to dialogue).
5. Draft an Advertisement for a given Product and E-mail Writing.
6. Do as directed Change of voice Units 42-46 (6X5= 30Marks)
7. Translation from Vernacular (Punjabi/ Hindi) to English (Isolated Sentences)
   i. (1X7 = 7Marks)

Course Objectives:

1. To develop common understanding between receivers and senders/listener and speaker.
2. To support speaker and listener to enhance two way process.
3. To help speaker to make message concise and clear which is understood by the listener.
4. To transform a message with a better outcome.

Course Contents:

1. Listening Skills: Barriers to listening; effective listening skills; feedback skills, attending telephone calls; note taking.

Activities:

c) Listening exercises – Listening to conversation, speech/ lecture and taking notes.

2.Speaking and Conversational Skills: Components of a meaningful and easy conversation; understanding the cue and making appropriate responses; forms of polite speech; asking and providing information on general topics, situation-based Conversation in English; essentials of Spoken English

Activities:

g) Conversation; dialogue and speech
h) Oral description or explanation of a common object, situation or concept.
i) Interviews and group discussion

Prescribed Book:

Murphy's English Grammar (by Raymond Murphy) CUP

References:

1. Oxford Guide to Effective Writing and Speaking by John Seely.
2. The Written Word by Vandana R Singh, Oxford University Press

Course Outcomes:

CO-5. To develop healthy relationship among the speaker and listener.

CO-6. To support the speaker to transfer knowledge, skills and emotion exact to listener.

CO-7. To let know others what is in our mind.

CO-8. To create better connections, clarify the doubts precisely and to create a sense of trust with the other person.

B.Sc. (Artificial Intelligence & Data Science)

Semester – II

BHPB-1201: **ਲਾਜ਼ਮੀ ਪੰਜਾਬੀ**

ਸਮਾਂ : 3 ਘੰਟੇ ਕ੍ਰੈਡਿਟ ਪ੍ਰਤੀ ਹਫਤਾ : 04

ਕੁੱਲ ਘੰਟੇ : 60 ਥਿਊਰੀ ਅੰਕ : 37, ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ : 13, ਕੁੱਲ ਅੰਕ : 50

ਅੰਕ-ਵੰਡ ਅਤੇ ਪ੍ਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

- ਸਿਲੇਬਸ ਦੇ ਚਾਰ ਭਾਗ ਹਨ ਪਰ ਪ੍ਰਸ਼ਨ-ਪੱਤਰ ਦੇ ਪੰਜ ਭਾਗ ਹੋਣਗੇ। ਪਹਿਲੇ ਚਾਰ ਭਾਗਾਂ ਵਿਚ 02-02 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰੇਕ ਭਾਗ ਵਿਚੋਂ 01-01 ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਲਾਜ਼ਮੀ ਹੋਵੇਗਾ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ (08) ਅੰਕ ਹੋਣਗੇ। ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਪੰਜਵੇਂ ਭਾਗ ਵਿਚ ਸਾਰੇ ਸਿਲੇਬਸ ਵਿਚੋਂ 01-01 ਅੰਕ ਦੇ ਛੇ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ, ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ 05 ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ ਦੇਣਾ ਲਾਜ਼ਮੀ ਹੋਵੇਗਾ। ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ-ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

ਨੋਟ: ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ 13 ਅੰਕਾਂ ਦੀ ਹੈ, ਜੋ ਕਾਲਜ ਵੱਲੋਂ ਨਿਰਧਾਰਿਤ ਦਿਸ਼ਾ ਨਿਰਦੇਸ਼ਾਂ ਅਨੁਸਾਰ ਥਿਊਰੀ ਅੰਕਾਂ ਤੋਂ ਵੱਖਰੀ ਹੋਵੇਗੀ। ਇਸ ਪੇਪਰ ਦੇ ਕੁੱਲ ਅੰਕ 37+13 = 50 ਹਨ।

ਕੋਰਸ ਦਾ ਉਦੇਸ਼ Course Objective

- ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਸਾਹਿਤਕ ਰੁਚੀਆਂ ਪੈਦਾ ਕਰਨਾ।
- ਆਲੋਚਨਾਤਮਕ ਰੁਚੀਆਂ ਨੂੰ ਵਿਕਸਤ ਕਰਨਾ।
- ਭਾਸ਼ਾਈ ਗਿਆਨ ਵਿਚ ਵਾਧਾ ਕਰਨਾ।

ਪਾਠ-ਕ੍ਰਮ ਨਤੀਜੇ Course Outcomes (COs)

- ਵਿਦਿਆਰਥੀ ਦੀ ਸੋਚ-ਸਮਝ ਵਿਕਸਤ ਹੋਵੇਗੀ।
- ਉਸ ਅੰਦਰ ਸਾਹਿਤਕ ਰੁਚੀਆਂ ਪ੍ਰਫਲਿੱਤ ਹੋਣਗੀਆਂ।
- ਉਸ ਅੰਦਰ ਸਾਹਿਤ ਸਿਰਜਣਾ ਦੀ ਸੰਭਾਵਨਾ ਵਧੇਗੀ।
- ਉਹ ਸੰਬੰਧਿਤ ਵਿਸ਼ੇ ਦਾ ਗਹਿਨ ਅਧਿਐਨ ਕਰਨ ਦੇ ਸੁਯੋਗ ਹੋਵੇਗਾ।
- ਉਹ ਭਾਸ਼ਾਈ ਬਣਤਰ ਤੋਂ ਜਾਣੂ ਹੋਵੇਗਾ।

ਪਾਠ-ਕ੍ਰਮ

ਭਾਗ-ਪਹਿਲਾ

ਸਾਹਿਤ ਦੇ ਰੰਗ, ਡਾ. ਮਹਿਲ ਸਿੰਘ (ਸੰਪਾ.), ਰਵੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।

ਭਾਗ ਦੂਜਾ - ਵਾਰਤਕ ਅਤੇ ਰੇਖਾ-ਚਿੱਤਰ, ਡਾ. ਪਰਮਿੰਦਰ ਸਿੰਘ, ਡਾ. ਭੁਪਿੰਦਰ ਸਿੰਘ ਅਤੇ ਡਾ. ਕੁਲਦੀਪ ਸਿੰਘ ਢਿੱਲੋਂ (ਸਹਿ ਸੰਪਾ.)

(ਵਾਰਤਕ ਭਾਗ ਵਿਚੋਂ ਸਾਰ/ਵਿਸ਼ਾ-ਵਸਤੂ। ਰੇਖਾ-ਚਿੱਤਰ ਭਾਗ ਵਿਚੋਂ ਸਾਰ/ਨਾਇਕ ਬਿੰਬ)

ਭਾਗ-ਦੂਜਾ

ਇਤਿਹਾਸਿਕ ਯਾਦਾਂ

ਸ. ਸ. ਅਮੋਲ (ਸੰਪਾ.), ਪੰਜਾਬੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।

(ਨਿਬੰਧ 7 ਤੋਂ 12 ਤਕ ਸਾਰ/ ਵਿਸ਼ਾ-ਵਸਤੂ/ਸ਼ੈਲੀ)

ਭਾਗ-ਤੀਜਾ

(ੳ) ਦਫ਼ਤਰੀ ਚਿੱਠੀ ਪੱਤਰ

(ਅ) ਮੁਹਾਵਰੇ ਅਤੇ ਅਖਾਣ

ਭਾਗ-ਚੌਥਾ

(ੳ) ਸ਼ਬਦ-ਬਣਤਰ ਅਤੇ ਸ਼ਬਦ-ਰਚਨਾ - ਪਰਿਭਾਸ਼ਾ ਅਤੇ ਮੁੱਢਲੇ ਸੰਕਲਪ

(ਅ) ਸ਼ਬਦ-ਸ਼੍ਰੇਣੀਆਂ

B.Sc. (Artificial Intelligence & Data Science)
Semester – II
BPBI-1202: ਮੁਢਲੀ ਪੰਜਾਬੀ
(In Lieu of Compulsory Punjabi)

ਸਮਾਂ : 3 ਘੰਟੇ ਕ੍ਰੈਡਿਟ ਪ੍ਰਤੀ ਹਫਤਾ : 04
ਕੁੱਲ ਘੰਟੇ : 60 ਥਿਊਰੀ ਅੰਕ : 37, ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ : 13, ਕੁੱਲ ਅੰਕ : 50

ਅੰਕ-ਵੰਡ ਅਤੇ ਪ੍ਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

- ਭਾਗ ਪਹਿਲਾ ਵਿਚੋਂ ਚਾਰ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਤਿੰਨ ਪ੍ਰਸ਼ਨਾਂ ਦਾ ਉੱਤਰ ਦੇਣਾ ਲਾਜ਼ਮੀ ਹੈ। ਹਰ ਪ੍ਰਸ਼ਨ ਦੇ ਚਾਰ-ਚਾਰ ਅੰਕ ਹਨ। ਭਾਗ ਦੂਸਰਾ ਵਿਚੋਂ ਦੋ-ਦੋ ਅੰਕ ਦੇ ਪੰਜ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਸਾਰੇ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹਨ। ਭਾਗ ਤੀਸਰਾ ਵਿਚੋਂ ਚਾਰ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਲਾਜ਼ਮੀ ਹਨ। ਭਾਗ ਚੌਥਾ ਵਿਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨਾ ਹੋਵੇਗਾ।
  ਨੋਟ: ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ 13 ਅੰਕਾਂ ਦੀ ਹੈ, ਜੋ ਕਾਲਜ ਵੱਲੋਂ ਨਿਰਧਾਰਿਤ ਦਿਸ਼ਾ ਨਿਰਦੇਸ਼ਾਂ ਅਨੁਸਾਰ ਥਿਊਰੀ ਅੰਕਾਂ ਤੋਂ ਵੱਖਰੀ ਹੋਵੇਗੀ। ਇਸ ਪੇਪਰ ਦੇ ਕੁਲ ਅੰਕ 37+13 = 50 ਹਨ।

ਕੋਰਸ ਦਾ ਉਦੇਸ਼ Course Objective

- ਵਿਦਿਆਰਥੀ ਅੰਦਰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੀ ਸਮਝ ਵਿਕਸਤ ਕਰਨਾ।
- ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੇ ਵਿਆਕਰਨਕ ਪ੍ਰਬੰਧ ਸੰਬੰਧੀ ਗਿਆਨ ਕਰਾਉਣਾ।
- ਸਿਖਲਾਈ ਤੇ ਅਭਿਆਸ ਦੁਆਰਾ ਪੰਜਾਬੀ ਭਾਸ਼ਾ 'ਤੇ ਪਕੜ ਵਧਾਉਣਾ।

ਪਾਠ-ਕ੍ਰਮ ਨਤੀਜੇ ਛੋਰਸਏ Outcomes (COs)

- ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ ਬਾਰੇ ਸਮਝ ਹੋਰ ਵਿਕਸਿਤ ਹੋਵੇਗੀ।
- ਉਹ ਪੰਜਾਬੀ ਸ਼ਬਦ-ਬਣਤਰ ਦੀ ਜਾਣਕਾਰੀ ਹਾਸਿਲ ਕਰਕੇ ਭਾਸ਼ਾਈ ਗਿਆਨ ਨੂੰ ਵਿਕਸਿਤ ਕਰਨਗੇ।
- ਪੰਜਾਬੀ ਸ਼ਬਦ-ਰਚਨਾ ਸੰਬੰਧੀ ਜਾਣਕਾਰੀ ਉਨ੍ਹਾਂ ਦੇ ਗਿਆਨ ਵਿਚ ਵਾਧਾ ਕਰੇਗੀ।

ਪਾਠ-ਕ੍ਰਮ

ਭਾਗ-ਪਹਿਲਾ

ਪੰਜਾਬੀ ਸ਼ਬਦ-ਬਣਤਰ :
ਧਾਤੂ, ਵਧੇਤਰ (ਅਗੇਤਰ, ਮਧੇਤਰ, ਪਿਛੇਤਰ), ਪੰਜਾਬੀ ਕੋਸ਼ਗਤ ਸ਼ਬਦ ਅਤੇ ਵਿਆਕਰਨਕ ਸ਼ਬਦ

ਭਾਗ-ਦੂਜਾ

ਪੰਜਾਬੀ ਸ਼ਬਦ-ਪ੍ਰਕਾਰ :
(ੳ) ਸੰਯੁਕਤ ਸ਼ਬਦ, ਸਮਾਸੀ ਸ਼ਬਦ, ਦੋਜਾਤੀ ਸ਼ਬਦ, ਦੋਹਰੇ/ਦੁਹਰੁਕਤੀ ਸ਼ਬਦ ਅਤੇ ਮਿਸ਼ਰਤ ਸ਼ਬਦ
(ਅ) ਸਿਖਲਾਈ ਤੇ ਅਭਿਆਸ

ਭਾਗ-ਤੀਜਾ

ਪੰਜਾਬੀ ਸ਼ਬਦ-ਰਚਨਾ :
ਇਕ-ਵਚਨ/ਬਹੁ-ਵਚਨ, ਲਿੰਗ-ਪੁਲਿੰਗ, ਬਹੁਅਰਥਕ ਸ਼ਬਦ, ਸਮਾਨਅਰਥਕ ਸ਼ਬਦ, ਬਹੁਤੇ ਸ਼ਬਦਾਂ ਲਈ ਇਕ ਸ਼ਬਦ, ਸ਼ਬਦ ਜੁੱਟ, ਵਿਰੋਧਅਰਥਕ ਸ਼ਬਦ, ਸਮਨਾਮੀ ਸ਼ਬਦ

ਭਾਗ-ਚੌਥਾ

ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ
ਖਾਣ-ਪੀਣ, ਸਾਕਾਦਾਰੀ, ਰੁੱਤਾਂ, ਮਹੀਨਿਆਂ, ਗਿਣਤੀ, ਮੌਸਮ, ਬਾਜ਼ਾਰ, ਵਪਾਰ, ਧੰਦਿਆਂ ਨਾਲ ਸੰਬੰਧਿਤ

B.Sc. (Artificial Intelligence & Data Science)

Semester – II

BPHC-1204: PUNJAB HISTORY & CULTURE (C 321 TO 1000 A.D.)

(Special Paper in lieu of Punjabi compulsory)

(For those students who are not domicile of Punjab)

Time: 3 Hours **Total. Marks: 50**

Theory: 37

Internal Assessment: 13

Instructions for the Paper Setter:

The question paper consists of five units: I, II, III, IV and V. Units I, II, III and IV will have two questions each. Each question carries 8 marks. The students are to attempt one question from each unit approximately in 800 words. Unit-V consists of 7 short answer type questions to be set from the entire syllabus. Students are to attempt any 5 questions in about 20 words each. Each questioncarries 1 mark.

Note: The examiner is to set the question paper in two languages: English & Hindi.

Course Objectives:

3.	The main objective of this course is to educate the students who are not domicile of the Punjab about the history and culture of the Ancient Punjab.
4.	It is to provide them knowledge about the social, economic, religious, cultural and political life of the peopleof the Punjab during the rule of various dynasties such as The Mauryans, The Khushans, The Guptas, The Vardhanas and other ancient ruling dynasties of the period under study.

Unit-I

1. Punjab under Chandragupta Maurya and Ashoka.
2. The Kushans and their Contribution to the Punjab.

Unit-II

3. The Punjab under the Gupta Emperors.
4. The Punjab under the Vardhana Emperors

Unit-III

5. Political Developments 7th Century to 1000 A.D.
6. Socio-cultural History of Punjab from 7th Century to 1000 A.D.

Unit-IV

7. Development of languages and Literature.
8. Development of art & Architecture.

Books Prescribed: -

1. L. Joshi (ed), History and Culture of the Punjab, Part-I, Patiala, 1989 (3rd edition)

2. L.M. Joshi and Fauja Singh (ed), History of Punjab, Vol.I, Patiala 1977.

3. Budha Parkash, Glimpses of Ancient Punjab, Patiala, 1983.

4. B.N. Sharma, Life in Northern India, Delhi. 1966.

Course Outcomes:

After completion of the course, the students will be able to learn:

CO-1	The history and culture of the Punjab in Ancient Period.
CO-2	Social, economic, religious, cultural and political life of Ancient Indian dynasties.
CO-3	Political developments from 7th century to1000AD.
CO-4	Socio-cultural history of the Punjab from 7th century to1000AD.
CO-5	Language, literature, art and architecture of Ancient Punjab.

B.Sc. (Artificial Intelligence & Data Science)
Semester – II
BAIDS-124P
LAB I: Data Structures Implementation using Python

Credit Hours (per week):4 **Total Marks: 40**
Total Hours:60 **Practical Marks: 30**
Practical Internal Assessment M: 10

Course Objectives:

1.	The main objective of this practical lab is to make the students to be able to implement the programs utilizing different data structure techniques to organize and manage data in computer's memory.
2.	The students will gain an understanding of different approaches available for searching and sorting the data and further be able to identify the methods requiring minimum time to perform the pre-mentioned tasks.

Data Structures Implementation using Python

1. Binary Search in Python
2. Linear Search in Python
3. Bubble Sort in Python
4. Insertion Sort in Python
5. Heap Sort in Python
6. Merge Sort in Python
7. Python program to create a Circular Linked List of N nodes and count the number of nodes
8. Python program to create a Circular Linked List of n nodes and display it in reverse order
9. Python program to create and display a Circular Linked List
10. Python program to delete a node from the beginning of the Circular Linked List
11. Python program to delete a node from the end of the Circular Linked List
12. Python program to delete a node from the middle of the Circular Linked List
13. Python program to find the maximum and minimum value node from a circular linked list
14. Python program to insert a new node at the beginning of the Circular Linked List
15. Python program to insert a new node at the end of the Circular Linked List

16. Python program to insert a new node at the middle of the Circular Linked List
17. Python program to remove duplicate elements from a Circular Linked List
18. Python program to search an element in a Circular Linked List
19. Python program to sort the elements of the Circular Linked List
20. Python program to convert a given binary tree to doubly linked list
21. Python program to create a doubly linked list from a ternary tree
22. Python program to create a doubly linked list of n nodes and count the number of nodes
23. Python program to create a doubly linked list of n nodes and display it in reverse order
24. Python program to create and display a doubly linked list
25. Python program to delete a new node from the beginning of the doubly linked list
26. Python program to delete a new node from the end of the doubly linked list
27. Python program to delete a new node from the middle of the doubly linked list
28. Python program to find the maximum and minimum value node from a doubly linked list
29. Python program to insert a new node at the beginning of the Doubly Linked list
30. Python program to insert a new node at the end of the Doubly Linked List

Course Outcomes:

After the completion of this course, students will be able

CO-1.	To implement the real world applications by making use of linear data structure, such as, arrays, stacks, queues, linked lists, trees and graphs, to handle the data stored in computer's memory.
CO-2.	To perform the implementation using non-linear data structure, such as, trees and graphs.
CO-3.	To perform traversing, insertion, and deletion operations on the above-mentioned data structures.
CO-4.	To perform the search operations by making use of suitable search technique.
CO-5.	To sort the data by using different sorting techniques and can also assess the time requirement of the available sorting techniques.

B.Sc. (Artificial Intelligence & Data Science)
Semester – II
BAIDS-125P
Lab II: Data Mining Algorithms implementation

Credit Hours (per week):4 **Total Marks: 35**
Total Hours:60 **Practical Marks: 26**
Practical Internal Assessment M: 09

COURSE OBJECTIVES

1.	Be familiar with mathematical data mining tools & implement them practically.
2.	Understand and implementation of classical models and algorithms in SQL.
3.	Characterization, pattern recognition, rule mining, classification and clustering.
4.	Master data mining techniques in various applications like social, scientific and environmental context.
5.	Develop skills in selecting the appropriate data mining algorithm for solving practical problems

Data Mining Algorithms

1. C4.5 Algorithm
2. K-mean Algorithm
3. Support Vector Machines
4. Apriori Algorithm
5. Expectation-Maximization Algorithm
6. PageRank Algorithm
7. Adaboost Algorithm
8. kNN Algorithm
9. Naive Bayes Algorithm
10. CART Algorithm

Course Outcomes:

C0-1	Understand the functionality of the various data mining and data warehousing languages.
C0-2	Understand the strengths and limitations of various data mining and data warehousing models & their implementations.
C0-3	Apply, Create and Explain the analysing techniques of various data in SQL,PL/SQL.
C0-4	Analyse and Describe different methodologies used in data mining and data ware housing in various software.

B.Sc. (Artificial Intelligence & Data Science)
Semester – II
Course Code: ZDA121
Course Title-DRUG ABUSE: PROBLEM, MANAGEMENT AND PREVENTION
DRUG ABUSE: MANAGEMENT AND PREVENTION
(Compulsory for all Under Graduate Classes)

Credit Hours (per week): 1.5 hrs.
Total Hours: 22.5 hrs.
Max. Marks: 50

Instructions for the Paper Setters:

Section–A: (15 Marks): It will consist of five short answer type questions. Candidates will be required to attempt three questions, each question carrying 05 marks. Answer to any of the questions should not exceed two pages.

Section–B: (20 Marks) It will consist of four essay type questions. Candidates will be required to attempt two questions, each question carrying 10 marks. Answer to any of the questions should not exceed four pages.

Section–C: (15 Marks) It will consist of two questions. Candidate will be required to attempt one question only. Answer to the question should not exceed 5 pages.

Course Objectives:

The course aim is to

CO-1.	Describe the role of family in the prevention of drug abuse.
CO-2.	Describe the role of school and teachers in the prevention of drug abuse.
CO-3.	Emphasize the role of media and educational and awareness program.
CO-4.	Provide knowhow about various legislation and Acts against drug abuse.

UNIT-I

- **Prevention of Drug abuse**

  Role of family: Parent child relationship, Family support, Supervision, Shaping values, Active scrutiny.

UNIT-II

- **School:** Counseling, Teacher as role-model, Parent-Teacher-Health Professional Coordination, Random testing on students.

UNIT-III

- **Controlling Drug Abuse**

  Media: Restraint on advertisements of drugs, advertisements on bad effects of drugs, Publicity and media, Campaigns against drug abuse, Educational and Awareness Program

UNIT-IV

- **Legislation:** NDPS Act, Statutory warnings, Policing of Borders, Checking Supply/Smuggling of Drugs, Strict enforcement of laws, Time bound trials.

References:

1. Extent, Pattern and Trend of Drug Use in India, Ministry of Social Justice and Empowerment, Government of India, 2004.
2. Gandotra, R. and Randhawa, J.K. 2018. ਡਰੱਗਜ਼ ਦੁਰਵਰਤੋਂ (ਨਸ਼ਾਖੋਰੀ) ਪ੍ਰਬੰਧਨ ਅਤ ਰੋਕਥਾਮ। Kasturi Lal & Sons, Educational Publishers, Amritsar- Jalandhar.
3. Inciardi, J.A. 1981. The Drug Crime Connection. Beverly Hills: Sage Publications.
4. Modi, Ishwar and Modi, Shalini (1997) Drugs: Addiction and Prevention, Jaipur: Rawat Publication.
5. Randhawa, J.K. and Randhawa, Samreet 2018. Drug Abuse-Management and Prevention. Kasturi Lal & Sons, Educational Publishers, Amritsar- Jalandhar.
6. Sain, Bhim 1991, Drug Addiction Alcoholism, Smoking obscenity New Delhi: Mittal Publications.
7. Sandhu, Ranvinder Singh, 2009, Drug Addiction in Punjab: A Sociological Study. Amritsar: Guru Nanak Dev University.
8. Singh, Chandra Paul 2000. Alcohol and Dependence among Industrial Workers: Delhi: Shipra. 9. World Drug Report 2011, United Nations office of Drug and Crime.
10. World Drug Report 2010, United Nations office of Drug and Crime

Course Outcomes:

The students will be able to:

CO-1.	Understand the importance of family and its role in drug abuse prevention.
CO-2.	Understand the role of support system especially in schools and inter-relationships between students, parents and teachers.
CO-3.	Understand impact of media on substance abuse prevention.
CO-4.	Understand the role of awareness drives, campaigns etc. in drug abuse management.
CO-5	Learn about the Legislations and Acts governing drug trafficking and Abuse in India.

SYLLABUS FOR THE BATCH FROM THE YEAR 2022 TO YEAR 2025

Programme Code: BVSD

Programme Name: B.VOC (SOFTWARE DEVELOPMENT)

(Semester I-VI)

Examinations: 2022-2025

P.G. Department of Computer Science & Applications

Khalsa College, Amritsar

Programme name: B.VOC (SOFTWARE DEVELOPMENT)
Programme code: BVSD
Programme Duration :3 years

Programme Objectives:

1.	The vocational educational programme mainly focuses on Job specific Skills rather than the board or council-based education.
2.	To provide vertical mobility to students coming out of 10+2 with vocational subjects.
3.	To provide mix of skills relating to a profession and appropriate content of General Education.
4.	To ensure that the students have adequate knowledge and skills, so that they are work ready at each exit point of the program.
5.	To provide flexibility to the students by means of predefined entry and multiple exit points.
6.	To enhance employability of the graduates and meet industry requirements.
7.	This program improves the skills of the candidates by concentrating on theoretical knowledge as well as practical training.

Program Specific Outcomes (PSO):

PSO-1.	Better acquaintance with latest technologies and working of Software industry.
PSO-2.	Creating new ideas in the field of software development and resolving problems related to this field
PSO-3.	Learning, designing and performing programs and projects in lab as per the concepts learn in course
PSO-4.	Better understanding by analysing and developing computer programs in the areas related to mobile application design and web design.
PSO-5.	Deliver a quality product by applying standard software engineering processes and strategies in software project development using open-source programming environment.
PSO-6.	Performing jobs or self-career in various fields like Software/Website Development, Graphic Designing.

BACHELOR OF VOCATION (B.VOC.) (SOFTWARE DEVELOPMENT)

Semester – I

Sr. No.	Paper Code	Paper Name	Marks				Page No.
			Theory	Internal Assessment	Practical	Total	
1	BCSV-1129	Communication Skills in English –I	25	13	12	50	447-449
2	BHPB-1101/BPBI-1102/BPHC-1104	Punjabi (Compulsory) / *Basic Punjabi / ** Punjab History & Culture	37	13		50	450-453
3	ZDA111	*** Drug Abuse: Problem, Management and Prevention (Compulsory Paper) -I	37	13		50	454-456
4	BVSD 114	Fundamentals of Information Technology	37	13		50	457-458
5	BVSD 115	Web Technology	37	13		50	459-460
6	BVSD 116	Programming using C Language	37	13		50	461-462
7	BVSD 117P	Lab I: Office Automation and Web Technology		19	56	75	463
8	BVSD 118P	Lab II: Programming in C Language		19	56	75	464

BACHELOR OF VOCATION (B.VOC.) (SOFTWARE DEVELOPMENT)
SEMESTER-I
BCSV-1129: COMMUNICATION SKILLS IN ENGLISH–I
Semester-I

Time: 3 Hours **Max. Marks: 50**
Credit Hours (per week):4 **Theory Marks: 25**
Total Hours: 60 **Practical Marks: 12**
Internal Assessment: 13

Instructions for the Paper Setters:-
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.(5X5=25 Marks)
The syllabus is divided in four sections as mentioned below:
Course Objectives:

1. To enable the students to read English and comprehension and interpret the text.
2. Reading strategies will improve comprehension skills.
3. Students will practice a deliberate writing process with emphasis on inquiry, audience, research and revision.

Section–A

Reading Skills: Reading Tactics and strategies; Reading purposes–kinds of purposes and associated comprehension.

Section–B

Reading for understanding concepts, details, coherence.

Activities:

• Short comprehension questions based on content and development of ideas

Section–C

Writing Skills: Writing styles for application, personal letter, official/ business letter.

Activities:

• Formatting personal and business letters.

Section–D

Resume, memo and notices; outline and revision.

Activities:

• Converting a biographical note into a sequenced resume or vice-versa
• Writing notices for circulation/boards

Recommended Books:

• Oxford Guide to Effective Writing and Speaking by John Seely.
• English Grammar in Use (Fourth Edition) by Raymond Murphy, CUP

Course Outcomes (Cos):

On Completing the course, the students will be able to:

CO-1.	Interpret text with attention to ambiguity, complexity and aesthetic values.
CO-2.	Evaluate genre of writing and write in appropriate genre and modes for a variety of purposes and audiences.
CO-3.	Able read diverse texts within their historical and cultural context which developed their critical understanding of literature.
CO-4.	Improve their reading fluency skills through extensive reading.

BACHELOR OF VOCATION (B.VOC.) (SOFTWARE DEVELOPMENT)

SEMESTER-I

BCSV-1129: COMMUNICATION SKILLS IN ENGLISH–I
(Practical)

Practical Marks: 12

Course Contents:-

1. Assignment on selected topics in about 700-1000 words.
2. Comprehension passage

Questions:-

1. Handwritten Assignment should be submitted to the concerned teachers in a stick file.
2. Short comprehension questions based on unseen passage.

Note: Oral test will be conducted by external examiner with the help of internal examiner.

BACHELOR OF VOCATION (B.VOC.) (SOFTWARE DEVELOPMENT)

SEMESTER-I

BHPB-1101

ਲਾਜ਼ਮੀ ਪੰਜਾਬੀ

ਸਮਾਂ : 3 ਘੰਟੇ ਕ੍ਰੈਡਿਟ ਪ੍ਰਤੀ ਹਫਤਾ : 04

ਕੁੱਲ ਘੰਟੇ : 60 ਥਿਊਰੀ ਅੰਕ : 37, ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ : 13, ਕੁੱਲ ਅੰਕ : 50

ਅੰਕ-ਵੰਡ ਅਤੇ ਪ੍ਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

- ਸਿਲੇਬਸ ਦੇ ਚਾਰ ਭਾਗ ਹਨ ਪਰ ਪ੍ਰਸ਼ਨ-ਪੱਤਰ ਦੇ ਪੰਜ ਭਾਗ ਹੋਣਗੇ। ਪਹਿਲੇ ਚਾਰ ਭਾਗਾਂ ਵਿਚ 02-02 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰੇਕ ਭਾਗ ਵਿਚੋਂ 01-01 ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਲਾਜ਼ਮੀ ਹੋਵੇਗਾ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ (08) ਅੰਕ ਹੋਣਗੇ। ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਪੰਜਵੇਂ ਭਾਗ ਵਿਚ ਸਾਰੇ ਸਿਲੇਬਸ ਵਿਚੋਂ 01-01 ਅੰਕ ਦੇ ਛੇ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ, ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ 05 ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ ਦੇਣਾ ਲਾਜ਼ਮੀ ਹੋਵੇਗਾ। ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ-ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

  ਨੋਟ: ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ 13 ਅੰਕਾਂ ਦੀ ਹੈ, ਜੋ ਕਾਲਜ ਵੱਲੋਂ ਨਿਰਧਾਰਿਤ ਦਿਸ਼ਾ ਨਿਰਦੇਸ਼ਾਂ ਅਨੁਸਾਰ ਥਿਊਰੀ ਅੰਕਾਂ ਤੋਂ ਵੱਖਰੀ ਹੋਵੇਗੀ। ਇਸ ਪੇਪਰ ਦੇ ਕੁੱਲ ਅੰਕ 37+13 = 50 ਹਨ।

ਕੋਰਸ ਦਾ ਉਦੇਸ਼ Course Objective

- ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਸਾਹਿਤਕ ਰੁਚੀਆਂ ਪੈਦਾ ਕਰਨਾ।
- ਆਲੋਚਨਾਤਮਕ ਰੁਚੀਆਂ ਵਿਕਸਤ ਕਰਨਾ।
- ਮਾਤ ਭਾਸ਼ਾ ਦੀ ਸਮਝ ਨੂੰ ਵਿਕਸਤ ਕਰਨਾ

ਪਾਠ-ਕ੍ਰਮ ਨਤੀਜੇ Course Outcomes (COs)

- ਵਿਦਿਆਰਥੀ ਦੀ ਸਾਹਿਤਕ ਸੋਚ-ਸਮਝ ਵਿਕਸਤ ਹੋਵੇਗੀ।
- ਉਸ ਵਿਚ ਸਾਹਿਤ ਰੁਚੀਆਂ ਵਿਕਸਤ ਹੋਣਗੀਆਂ।
- ਉਸ ਵਿਚ ਸਾਹਿਤ ਸਿਰਜਣਾ ਦੀ ਸੰਭਾਵਨਾ ਵਧੇਗੀ।
- ਉਹ ਕਿਸੇ ਵੀ ਵਿਸ਼ੇ ਦਾ ਗਹਿਨ ਅਧਿਐਨ ਕਰਨ ਦੇ ਕਾਬਲ ਹੋਵੇਗਾ।
- ਉਹ ਮਾਤ ਭਾਸ਼ਾ ਦੇ ਵਿਕਾਸ ਵਿਚ ਵਿਸ਼ੇਸ ਯੋਗਦਾਨ ਪਾਉਣਗੇ।

ਪਾਠ-ਕ੍ਰਮ

ਭਾਗ-ਪਹਿਲਾ

ਸਾਹਿਤ ਦੇ ਰੰਗ, ਡਾ. ਮਹਿਲ ਸਿੰਘ (ਸੰਪਾ.), ਰਵੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।

ਭਾਗ ਪਹਿਲਾ - ਕਵਿਤਾ ਅਤੇ ਕਹਾਣੀ, ਡਾ. ਮਹਿਲ ਸਿੰਘ ਅਤੇ ਡਾ. ਆਤਮ ਰੰਧਾਵਾ (ਸਹਿ ਸੰਪਾ.)

(ਕਵਿਤਾ ਭਾਗ ਵਿਚੋਂ ਪ੍ਰਸੰਗ ਸਹਿਤ ਵਿਆਖਿਆ/ਵਿਸ਼ਾ-ਵਸਤੂ। ਕਹਾਣੀ ਭਾਗ ਵਿਚੋਂ ਸਾਰ/ਵਿਸ਼ਾ-ਵਸਤੂ)

ਭਾਗ-ਦੂਜਾ

ਇਤਿਹਾਸਿਕ ਯਾਦਾਂ

ਸ. ਸ. ਅਮੋਲ (ਸੰਪਾ.), ਪੰਜਾਬੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।

(ਨਿਬੰਧ 1 ਤੋਂ 6 ਤਕ ਸਾਰ/ ਵਿਸ਼ਾ-ਵਸਤੂ/ਸ਼ੈਲੀ)

ਭਾਗ-ਤੀਜਾ

(ੳ) ਪੈਰ੍ਹਾ ਰਚਨਾ (ਤਿੰਨਾਂ ਵਿਚੋਂ ਇਕ)

(ਅ) ਪੈਰ੍ਹਾ ਪੜ੍ਹ ਕੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ

ਭਾਗ-ਚੌਥਾ

(ੳ) ਭਾਸ਼ਾ ਵੰਨਗੀਆਂ : ਭਾਸ਼ਾ ਦਾ ਟਕਸਾਲੀ ਰੂਪ, ਭਾਸ਼ਾ ਅਤੇ ਉਪ-ਭਾਸ਼ਾ ਵਿਚਲਾ ਅੰਤਰ, ਪੰਜਾਬੀ ਉਪ-ਭਾਸ਼ਾਵਾਂ ਦੇ ਪਛਾਣ-ਚਿੰਨ੍ਹ

(ਅ) ਪੰਜਾਬੀ ਭਾਸ਼ਾ : ਨਿਕਾਸ ਤੇ ਵਿਕਾਸ

BACHELOR OF VOCATION (B.VOC.) (SOFTWARE DEVELOPMENT)

SEMESTER-I

BPBI-1102

ਮੁਢਲੀ ਪੰਜਾਬੀ

(In Lieu of Compulsory Punjabi)

ਸਮਾਂ : 3 ਘੰਟੇ ਕ੍ਰੈਡਿਟ ਪ੍ਰਤੀ ਹਫਤਾ : 04

ਕੁੱਲ ਘੰਟੇ : 60 ਥਿਊਰੀ ਅੰਕ : 37, ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ : 13, ਕੁੱਲ ਅੰਕ : 50

ਅੰਕ-ਵੰਡ ਅਤੇ ਪ੍ਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

- ਪਹਿਲੇ ਭਾਗ ਵਿਚੋਂ ਚਾਰ ਵਰਣਨਾਤਮਕ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਤਿੰਨ ਪ੍ਰਸ਼ਨਾਂ ਦਾ ਉੱਤਰ ਦੇਣਾ ਲਾਜ਼ਮੀ ਹੈ। ਹਰ ਪ੍ਰਸ਼ਨ ਦੇ ਚਾਰ-ਚਾਰ ਅੰਕ ਹਨ। ਭਾਗ ਦੂਸਰਾ ਵਿਚੋਂ ਦੋ-ਦੋ ਅੰਕ ਦੇ ਪੰਜ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਸਾਰੇ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹਨ। ਭਾਗ ਤੀਸਰਾ ਵਿਚੋਂ ਤਿੰਨ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਲਾਜ਼ਮੀ ਹਨ ਜਿਨ੍ਹਾਂ ਦੇ ਪੰਜ-ਪੰਜ ਅੰਕ ਹਨ। ਭਾਗ ਚੌਥਾ ਵਿਚ ਪੰਜ ਅਸ਼ੁੱਧ ਸ਼ਬਦਾਂ ਨੂੰ ਸ਼ੁੱਧ ਕਰਕੇ ਲਿਖਣਾ ਹੋਵੇਗਾ।

ਨੋਟ: ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ 13 ਅੰਕਾਂ ਦੀ ਹੈ, ਜੋ ਕਾਲਜ ਵੱਲੋਂ ਨਿਰਧਾਰਿਤ ਦਿਸ਼ਾ ਨਿਰਦੇਸ਼ਾਂ ਅਨੁਸਾਰ ਥਿਊਰੀ ਅੰਕਾਂ ਤੋਂ ਵੱਖਰੀ ਹੋਵੇਗੀ। ਇਸ ਪੇਪਰ ਦੇ ਕੁਲ ਅੰਕ 37+13 = 50 ਹਨ।

ਕੋਰਸ ਦਾ ਉਦੇਸ਼ Course Objective

- ਵਿਦਿਆਰਥੀ ਨੂੰ ਸ਼ੁੱਧ ਪੰਜਾਬੀ ਪੜ੍ਹਨਾ-ਲਿਖਣਾ ਸਿਖਾਉਣਾ।
- ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੀਆਂ ਵਿਆਕਰਨਕ ਬਾਰੀਕੀਆਂ ਤੋਂ ਜਾਣੂ ਕਰਾਉਣਾ।
- ਸ਼ੁੱਧ ਸੰਚਾਰ ਨੂੰ ਵਿਕਸਤ ਕਰਨਾ।

ਪਾਠ-ਕ੍ਰਮ ਨਤੀਜੇ Course Outcomes (COs)

- ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਅਤੇ ਗੁਰਮੁਖੀ ਲਿਪੀ ਦੀ ਸਿਖਲਾਈ ਵਿਚ ਮੁਹਾਰਤ ਹਾਸਿਲ ਕਰਨਗੇ।
- ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਵਿਚ ਮੁਹਾਰਨੀ, ਲਗਾਂ-ਮਾਤਰਾਂ, ਸਵਰ ਅਤੇ ਵਿਅੰਜਨ ਦੀ ਪਛਾਣ ਅਤੇ ਵਰਤੋਂ ਦੁਆਰਾ ਉਨ੍ਹਾਂ ਦੀ ਸਮਝ ਨੂੰ ਵਿਕਸਿਤ ਹੋਵੇਗੀ।
- ਪੰਜਾਬੀ ਸ਼ਬਦ-ਜੋੜਾਂ ਦੀ ਜਾਣਕਾਰੀ ਹਾਸਿਲ ਕਰਕੇ ਉਹ ਸ਼ੁੱਧ ਪੰਜਾਬੀ ਲਿਖਣ-ਪੜ੍ਹਨ ਦੇ ਸਮਰੱਥ ਹੋਣਗੇ।
- ਉਹ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੇ ਵਿਆਕਰਨ ਪ੍ਰਬੰਧ ਦੀ ਜਾਣਕਾਰੀ ਹਾਸਿਲ ਕਰਨਗੇ।

ਪਾਠ-ਕ੍ਰਮ

ਭਾਗ-ਪਹਿਲਾ

(ੳ) ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਤੇ ਗੁਰਮੁਖੀ ਲਿਪੀ :

ਨਾਮਕਰਣ ਤੇ ਸੰਖੇਪ ਜਾਣ-ਪਛਾਣ: ਗੁਰਮੁਖੀ ਵਰਣਮਾਲਾ, ਅੱਖਰ ਕ੍ਰਮ, ਸਵਰ ਵਾਹਕ (ਓ, ਅ, ੲ), ਲਗਾਂ-ਮਾਤਰਾਂ, ਪੈਰ ਵਿਚ ਬਿੰਦੀ ਵਾਲੇ ਵਰਨ, ਪੈਰ ਵਿਚ ਪੈਣ ਵਾਲੇ ਵਰਨ, ਬਿੰਦੀ, ਟਿੱਪੀ, ਅੱਧਕ

(ਅ) ਸਿਖਲਾਈ ਤੇ ਅਭਿਆਸ

ਭਾਗ-ਦੂਜਾ

ਗੁਰਮੁਖੀ ਆਰਥੋਗਰਾਫੀ ਅਤੇ ਉਚਾਰਨ :

ਸਵਰ, ਵਿਅੰਜਨ : ਮੁਢਲੀ ਜਾਣ-ਪਛਾਣ ਅਤੇ ਉਚਾਰਨ, ਮੁਹਾਰਨੀ, ਲਗਾਂ-ਮਾਤਰਾਂ ਦੀ ਪਛਾਣ

ਭਾਗ-ਤੀਜਾ

ਪੰਜਾਬੀ ਸ਼ਬਦ-ਜੋੜ : ਮੁਕਤਾ (ਦੋ ਅੱਖਰਾਂ ਵਾਲੇ ਸ਼ਬਦ, ਤਿੰਨ ਅੱਖਰਾਂ ਵਾਲੇ ਸ਼ਬਦ), ਸਿਹਾਰੀ ਵਾਲੇ ਸ਼ਬਦ, ਬਿਹਾਰੀ ਵਾਲੇ ਸ਼ਬਦ, ਔਂਕੜ ਵਾਲੇ ਸ਼ਬਦ, ਦੁਲੈਂਕੜ ਵਾਲੇ ਸ਼ਬਦ, ਲਾਂ ਵਾਲੇ ਸ਼ਬਦ, ਦੁਲਾਵਾਂ ਵਾਲੇ ਸ਼ਬਦ, ਹੋੜੇ ਵਾਲੇ ਸ਼ਬਦ, ਕਨੌੜੇ ਵਾਲੇ ਸ਼ਬਦ, ਲਗਾਖਰ (ਬਿੰਦੀ, ਟਿੱਪੀ, ਅੱਧਕ) ਵਾਲੇ ਸ਼ਬਦ

ਭਾਗ-ਚੌਥਾ

ਸ਼ੁੱਧ-ਅਸ਼ੁੱਧ ਸ਼ਬਦ

BACHELOR OF VOCATION (B.VOC.) (SOFTWARE DEVELOPMENT)

SEMESTER-I

BPHC-1104: PUNJAB HISTORY & CULTURE (From Earliest Times to C 320)
(Special Paper in lieu of Punjabi compulsory)
(For those students who are not domicile of Punjab)

Time: 3 Hours **Total. Marks: 50**
Credit Hours: 4 **Theory: 37**
Total Hours: 60 **Internal Assessment: 13**

Instructions for the Paper Setter:

The question paper consists of five units: I, II, III, IV and V. Units I, II, III and IV will have two questions each. Each question carries 8 marks. The students are to attempt one question from each unit approximately in 800 words. Unit-V consists of 7 short answer type questions to be set from the entire syllabus. Students are to attempt any 5 questions in about 20 words each. Each question carries 1 mark.

Note: The examiner is to set the question paper in two languages: English & Hindi.

Course Objectives:

1. The main objective of this course is to educate the history and culture of the Ancient Punjab to the students who are not domicile of the Punjab.
2. It aims to familiarize these students with the physical features of ancient Punjab and its impact on its history and culture.
3. It also provides them information about the different sources to construct the history and culture of the ancient Punjab.
4. The course intends to provide knowledge of social, economic, religious life of the Harrapan civilization, Indo-Aryans, teachings and impact of Jainism and Buddhism in the Punjab.

UNIT-I

1. Physical features of the Punjab and impact on history.
2. Sources of the ancient history of Punjab.

UNIT-II

3. Harappan Civilization: Town planning; social, economic and religious life of the Indus Valley People.
4. The Indo-Aryans: Original home and settlement in Punjab.

UNIT-III

5. Social, Religious and Economic life during Rig Vedic Age.
6. Social, Religious and Economic life during later Vedic Age.

UNIT-IV

7. Teachings and impact of Buddhism.
8. Jainism in the Punjab.

References: -

1. L. Joshi (ed), History and Culture of the Punjab, Art-I, Patiala, 1989 (3rd edition)
2. L.M. Joshi and Fauja Singh (ed), History of Punjab, Vol.I, Patiala 1977.
3. Budha Parkash, Glimpses of Ancient Punjab, Patiala, 1983.
4. B.N. Sharma, Life in Northern India, Delhi. 1966.

Course Outcomes:

After completion of the course, the students will be able to learn:

CO-1 The history and culture of the Ancient Punjab.
CO-2 Physical features of ancient Punjab.
CO-3 The sources of the history of the Punjab.
CO-4 Social, economic, religious life of the Harrapan civilization and Vedic-Aryans.
CO-5 Teachings and impact of Jainism and Buddhism in the Punjab.

BACHELOR OF VOCATION (B.VOC.) (SOFTWARE DEVELOPMENT)
SEMESTER-I
ZDA111
Drug Abuse: Problem, Management and Prevention
PROBLEM OF DRUG ABUSE
(Compulsory for all Under Graduate Classes)

Credit Hours (per week): 1.5 h
Total Hours: 22.5 hrs.
Max. Marks: 50

Instructions for the Paper Setters:

Section–A: (15 Marks): It will consist of five short answer type questions. Candidates will be required to attempt three questions, each question carrying 05 marks. Answer to any of the questions should not exceed two pages.

Section–B: (20 Marks) It will consist of four essay type questions. Candidates will be required to attempt two questions, each question carrying 10 marks. Answer to any of the questions should not exceed four pages.

Section–C: (15 Marks) It will consist of two questions. Candidate will be required to attempt one question only. Answer to the question should not exceed 5 pages.

Course Objectives

The course aims to:

CO-1.	Generate the awareness against drug abuse.
CO-2.	Describe a variety of models and theories of addiction and other problems related to substance abuse.
CO-3.	Describe the behavioral, psychological, physical health and social impact of psychoactive substances.
CO-4.	Provide culturally relevant formal and informal education programs that raise awareness and support for substance abuse prevention and the recovery process.
CO-5.	Describe factors that increase likelihood for an individual, community or group to be at risk of substance use disorders.

UNIT–I

- **Meaning of Drug Abuse**

  Meaning, Nature and Extent of Drug Abuse in India and Punjab.

UNIT-II

- **Consequences of Drug Abuse for:**

  Individual : Education, Employment and Income.

  Family : Violence.

  Society : Crime.

  Nation : Law and Order problem.

UNIT-III

- **Management of Drug Abuse**

Medical Management: Medication for treatment and to reduce withdrawal effects.

UNIT-IV

- Psychiatric Management: Counseling, Behavioral and Cognitive therapy.
- Social Management: Family, Group therapy and Environmental Intervention.

References:

1. Ahuja, Ram (2003), Social Problems in India, Rawat Publication, Jaipur.
2. Extent, Pattern and Trend of Drug Use in India, Ministry of Social Justice and Empowerment, Government of India, 2004.
3. Inciardi, J.A. 1981. The Drug Crime Connection. Beverly Hills: Sage Publications. 23
4. Jasjit Kaur Randhawa & Samreet Randhawa, "Drug Abuse-Problem, Management & Prevention", KLS, ISBN No. 978-81-936570-6-5, (2018).
5. Jasjit Kaur Randhawa & Samreet Randhawa, "Drug Abuse Problem, Management & Prevention", KLS, ISBN No. 978-81-936570-8-9, (2019).
6. Jasjit Kaur Randhawa & Samreet Randhawa, "ਡਰੱਗਜ਼ ਦੁਰਵਰਤੋਂ-(ਨਸ਼ਾਖੋਰੀ) ਸਮੱਸਿਆ, ਪ੍ਰਬੰਧਨ ਅਤੇ ਰੋਕਥਾਮ", KLS, ISBN No. 978-81-936570-7-1, (2018).
7. Jasjit Kaur Randhawa, "Drug Abuse -Management & Prevention", KLS, ISBN No. 978-93-81278-80-2, (2018).
8. Kapoor. T. (1985) Drug epidemic among Indian Youth, New Delhi: Mittal Pub.
9. Modi, Ishwar and Modi, Shalini (1997) Drugs: Addiction and Prevention, Jaipur: Rawat Publication.
10. National Household Survey of Alcohol and Drug abuse. (2003) New Delhi, Clinical Epidemiological Unit, All India Institute of Medical Sciences, 2004.
11. Rama Gandotra & Jasjit Kaur Randhawa, "ਡਰੱਗਜ਼ ਦੁਰਵਰਤੋਂ-(ਨਸ਼ਾਖੋਰੀ) ਪ੍ਰਬੰਧਨ ਅਤੇ ਰੋਕਥਾਮ", KLS, ISBN No. 978-93-81278-87-1, (2018).
12. Sain, Bhim 1991, Drug Addiction Alcoholism, Smoking obscenity New Delhi: Mittal Publications.
13. Sandhu, Ranvinder Singh, 2009, Drug Addiction in Punjab: A Sociological Study. Amritsar: Guru Nanak Dev University.
14. Singh, Chandra Paul 2000. Alcohol and Dependence among Industrial Workers: Delhi: Shipra.
15. Sussman, S and Ames, S.L. (2008). Drug Abuse: Concepts, Prevention and Cessation, Cambridge University Press.
16. World Drug Report 2010, United Nations office of Drug and Crime.

17. World Drug Report 2011, United Nations office of Drug and Crime.

Course Outcomes:

The students will be able:

CO-1.	To describe issues of cultural identity, ethnic background, age and gender in prevention, treatment and recovery.
CO-2.	To describe warning sign, symptoms, and the course of substance use disorders.
CO-3.	To describe principles and philosophy of prevention, treatment and recovery.
CO-4.	To describe current and evidenced-based approaches practiced in the field of addictions.

BACHELOR OF VOCATION (B.VOC.) (SOFTWARE DEVELOPMENT)
SEMESTER-I

BVSD 114: Fundamentals of Information Technology

Time: 3 Hrs. **Max. Marks: 50**
Credit Hours (per week):4 **Theory Marks: 37**
Total Hours: 60 **Internal Assessment Marks: 13**

Instructions for the Paper Setters:- Medium of Examination is English Language.
Instructions for Paper Setters:

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry 1.5 marks with answer to each question up to 10 lines in length. The total weightage being 09 marks.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 07 marks. The total weightage of this section shall be 14 marks.

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 07 marks. The total weightage of this section shall be 14 marks.

Course Objectives:

At the end of the course, the students will be able to:

1.	Understand working of computers and its components such as Input/output devices, hardware, software and other basic terminologies along with their classification.
2.	Make familiar with the part and function of computer, its types, how to use computer in our day-to-day life.
3.	Understand the various Development and Programming Tools.
4.	Learn how computer network hardware and software operate and will make them familiar with the latest and dominant network technologies.

UNIT-I

An overview of computer system: Block diagram of Computer, Components of Computers, and advantages of computer.

I/O and storage Devices: Keyboard, mouse, pens, touch screens, Bar Code reader, joystick, Monitor, printers, plotters, Primary storage (Storage addresses and capacity, type of memory), Secondary storage, Magnetic storage devices and optical storage devices

NIT-II

Number System: decimal, binary, octal, hexadecimal numbers and their–conversions
Development Tools: Editors, Translators, Compilers, Interpreters, Linkers Loaders, Debuggers.
Programming Tools: Problem Analysis, Program Constructs (Sequential, Decision, Loop), Algorithms, Flowcharts, Pseudo code, Decision table

Data Communications: Introduction to Data Communication, Network and its types, topologies, Transmission Media and modes.

References:

1. **V.K. Jain: Fundamentals of Information Technology.**
2. **Norton, Peter: Introduction to Computers, McGraw Hill**
3. **Computer Fundamentals, P.K. Sinha**

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Operate computer independently and professionally.
CO-2.	Use various programming and development tools.
CO-3.	Understand binary, hexadecimal and octal number systems and their arithmetic.
CO-4.	Independently understand basic computer network technology.
CO-5.	Understand and explain Data Communications System and its components.

BACHELOR OF VOCATION (B.VOC.) (SOFTWARE DEVELOPMENT)
SEMESTER-I

BVSD-115: Web Technology

Time: 3 Hrs. **Max. Marks: 50**
Credit Hours (per week): 4 Total Hours: 60 **Theory Marks:37**
Internal Assessment Marks: 13

Instructions for the Paper Setters: - Medium of Examination is English Language.
Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **1.5 marks** with answer to each question up to 10 lines in length. The total weightage being 09 marks.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 07 marks. The total weightage of this section shall be **14 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **07 marks**. The total weightage of this section shall be **14 marks**.

Course Objectives:

1. Gain knowledge about the principles of web environment.
2. Principles related to web design and transform these theories into practice.
3. Ability to design static and dynamic web pages.
4. Learn the web languages: HTML, Javascript and CSS.
5. Learn the concepts of domain, web space and website publishing.

UNIT-I

Introduction to Web Development
Webpage, Website, Static Website, Dynamic Website, Web Servers, Web Browsers

Introduction to HTML/DHTML
HTML Basics, HTML Elements (Tags), Structure of HTML Program, Attributes, Headings, Paragraphs, Formatting, Links, Images, Tables, Lists, Forms, Frames, Where to put Tables, Lists, Images, Forms, CSS in DHTML, Implementation of WebPages using CSS.

Introduction to JavaScript:
How & Where to put the JavaScript Code, JavaScript Statements, Comments, Variables, Operators, Control Statements, Loops, Popup Boxes, Functions.

UNIT-II

Introduction to Dreamweaver

Understanding Workspace Layout, Managing Websites, Creating a Website, Using Dreamweaver

Templates, Adding New WebPages, Text and Page Format, Inserting Tables, Lists, Images, Adding Links.

Purchasing a Domain Name & Web Space

Domain Name & Web Space, Getting a Domain Name & Web Space (Purchase or Free), Uploading the Website to Remote Server.

References:

1. Web Enabled Commercial Application Development HTML (Ivan Bayross)
2. JavaScript, a Beginner's Guide John Pollock, Third Edition
3. Dreamweaver CS5 for Dummies Janine C. Warner, Paperback Edition
4. The Essential Guide to Dreamweaver CS4 David Powers.

Course Outcomes (Cos):

On Completing the course, the students will be able to:

CO-1.	Gain knowledge of HTML and CSS code and using this knowledge, they are able to create websites.
CO-2.	Learn to write code using javascript.
CO-3.	Able to create online forms.
CO-4.	Learn how to publish website to the web.

BACHELOR OF VOCATION (B.VOC.) (SOFTWARE DEVELOPMENT)
SEMESTER-I

BVSD-116: Programming using C Language

Time: 3 Hrs. **Max. Marks: 50**
Credit Hours (per week):4 **Theory Marks: 37**
Total Hours: 60 **Theory Internal Assessment Marks: 13**

Instructions for the Paper Setters:- Medium of Examination is English Language.
Instructions for Paper Setters:

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry 1.5 marks with answer to each question up to 10 lines in length. The total weightage being 09 marks.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 07 marks. The total weightage of this section shall be 14 marks.

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 07 marks. The total weightage of this section shall be 14 marks.

Course Objectives:

1.	The course is oriented to those who want to advance structured and procedural programming, understand and improve C programming skills.
2.	The major objective is to provide students with understanding of code organization and functional hierarchical decomposition using complex data types.

UNIT-I

C language preliminaries: Introduction to C, Identifiers and Key Words, Data types, Constants, Variables, Expressions, Statements.

Operators and I/O functions: Arithmetic operators, Unary operators, RelationalOperators, Logical Operators, Assignment and Conditional Operators, getchar, putchar, printf, gets, puts

Control Statements: While, Do–while and for statements, Nested loops, If–else, Switch, Break – Continue statements.

Functions: Brief overview, types, defining, accessing functions, passing arguments to function, specifying argument data types, function prototypes, recursion.

UNIT-II

Arrays and Pointers Defining, processing an array, passing arrays to a function, multi–dimensional arrays, Introduction to pointers, Operations on pointers, Pointers and array.

Structure and Union: A simple structure, specifying the structure, defining a structure variable Accessing Structure member, Structure within structure, union, difference between structure and union.

Data Files: Opening, closing, creating, processing and unformatted data files.

References:

1. Let us C, Yashwant Kanetkar
2. C – programming E. Balagurusamy Tata McGraw Hill
3. Complete reference with C Tata McGraw Hill.

Course Outcomes (COs):

On Completing the course, the students will be able to:

CO-1.	On successful completion of this subject the students will gain the programming ability in C Language.
CO-2.	Students would be capable of developing various applications to solve real world problems.
CO-3.	Understanding a concept of object thinking within the framework of functional model.
CO-4.	They will be able to make system as well as application software.
CO-5.	Provide the ability to handle possible errors during program execution.

BACHELOR OF VOCATION (B.VOC.) (SOFTWARE DEVELOPMENT)
SEMESTER-I

BVSD 117P : Lab – I: Office Automation and Web Technology

Time: 3 Hrs. **Max. Marks:75**
Credit Hours (per week):4 **Practical Marks:56**
Total Hours: 60 **Internal Assessment Marks: 19**

Course Objectives:

1.	Enable the students to create professional word documents, excel spread sheets and PowerPoint presentations.
2.	Provides in-depth knowledge of various web languages: HTML and DHTML.
3.	Allow students to build and publish web pages.

Practical based on Office Automation and Web Technology

- **Office Automation:** MS Word, MS Excel, MS PowerPoint
- **Web Technology:** HTML, DHTML, Dreamweaver

Course Outcomes (Cos):

On Completing the course, the students will be able to:

CO-1.	Creating word documents and mail merge.
CO-2.	Acquire the required presentations skills and learn to perform accounting operations by using formulas.
CO-3.	Learn how to create and insert tables.
CO-4.	Learn to apply various formatting schemes.
CO-5.	Hands on practice to develop web pages using HTML and DHTML, and publish website using Dreamweaver.

BACHELOR OF VOCATION (B.VOC.) (SOFTWARE DEVELOPMENT)
SEMESTER-I
BVSD 118P: Lab – II: Programming in C Language

Time: 3 Hrs. **Max. Marks: 75**
Credit Hours (per week):4 **Practical Marks: 56**
Total Hours: 60 **Internal Assessment Marks: 19**

Course Objectives:

1.	The course is oriented to those who want to advance structured and procedural programming understating and to improve C programming skills.
2.	The major objective is to provide students with understanding of code organization and functional hierarchical decomposition with using complex data types.

Practical based on Programming in C language

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Capable to use the fundamentals of C programming in trivial problem solving.
CO-2.	Identify solution to a problem and apply control structures and user defined functions for solving the problems.
CO-3.	Understanding the concept of arrays and their different types.
CO-4.	Read, understand and trace the execution of programs.
CO-5.	Ability to handle possible syntax and run time errors at the time of program execution

BACHELOR OF VOCATION (B.VOC.) (SOFTWARE DEVELOPMENT)

Semester – II

Sr. No.	Paper Code	Paper Name	Marks				Page No.
			Theory	Internal Assessment	Practical	Total	
1	BCSV-1229	Communication Skills in English –II	25	13	12	50	466-468
2	BHPB-1201/BPBI-1202/BPHC-1204	Punjabi (Compulsory) / * Basic Punjabi /** Punjab History & Culture.	37	13		50	469-472
3	ZDA112	*** Drug Abuse: Problem, Management and Prevention (Compulsory Paper)-II	37	13		50	473-474
4	BVSD 124	Internet Applications	37	13		50	475-476
5	BVSD 125	Data Structures	37	13		50	477-478
6	BVSD 126	Object Oriented Programming	37	13		50	479-480
7	BVSD 127P	Lab I: Programming in C++		19	56	75	481
8	BVSD 128P	Lab II: Practical based on Data Structure		19	56	75	482

Note: 1. * Special Paper in lieu of Punjabi Compulsory.

2. ** For those students who are not domicile of Punjab

3. ***Marks of this Paper will not be included in the Total Marks.

BACHELOR OF VOCATION (B.VOC.) (SOFTWARE DEVELOPMENT)

SEMESTER-II

BCSC-1229: COMMUNICATION SKILLS IN ENGLISH–II

Time: 3 Hours **Max. Marks: 50**
Credit Hours (per week):4 **Theory Marks: 25**
Total Hours: 60 **Practical Marks: 12**
Assessment: 13

Instructions for the Paper Setters: -
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section. (5X5=25 Marks)

Course Objectives:

5. Define an understand communication and the communication process.

6. Practice active listening.

7. Identify the modes of communication.

8. Two sports speaker and listener to enhance two way process.

Course Contents:

SECTION–A

Listening Skills: Barriers to listening; effective listening skills.
Activities: Listening exercises- News and TV reports

SECTION–B

Attending telephone calls; note making.
Activities: Taking notes on a speech/lecture

SECTION–C

Speaking and Conversational Skills: Components of a meaningful and easy conversation; understanding the cue and making appropriate responses; forms of polite speech; asking and providing information on general topics.

Activities: 1) Making conversation and taking turns
2) Oral description or explanation of a common object, situation or concept

SECTION–D

Situation based Conversation in English, Essentials of Spoken English

Activities: Giving Interviews

References:

- Oxford Guide to Effective Writing and Speaking by John Seely.

- English Grammar in Use (Fourth Edition) by Raymond Murphy, CUP

Course Outcomes:

CO-1. Students will improve their speaking ability in English both in terms of valency and comprehensibility.

CO-2. Students will give oral presentations and receive feedback on their performance.

CO-3. IT enhance and development the two way process which is helpful to establish healthy relationships among the speakers and the listeners.

BACHELOR OF VOCATION (B.VOC.) (SOFTWARE DEVELOPMENT)
SEMESTER-II

BCSV-1229: COMMUNICATION SKILLS IN ENGLISH–II
(Practical)

Practical Marks: 12

Course Contents:-

1. Oral Presentation with/without audio visual aids.
2. Group Discussion.
3. Listening to any recorded or live material and asking oral questions for listening comprehension.

Questions:-

1. Oral Presentation will be of 5 to 10 minutes duration (Topic can be given in advance or it can be student's own choice). Use of audio-visual aids is desirable.
2. Group discussion comprising 8 to 10 students on a familiar topic. Time for each group will be 15 to 20minutes.

Note: Oral test will be conducted by external examiner with the help of internal examiner.

BACHELOR OF VOCATION (B.VOC.) (SOFTWARE DEVELOPMENT)
SEMESTER-II

BHPB-1201: **ਲਾਜ਼ਮੀ ਪੰਜਾਬੀ**

ਸਮਾਂ : 3 ਘੰਟੇ ਕ੍ਰੈਡਿਟ ਪ੍ਰਤੀ ਹਫਤਾ : 04
ਕੁੱਲ ਘੰਟੇ : 60 ਥਿਊਰੀ ਅੰਕ : 37, ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ : 13, ਕੁੱਲ ਅੰਕ : 50

ਅੰਕ-ਵੰਡ ਅਤੇ ਪ੍ਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

- ਸਿਲੇਬਸ ਦੇ ਚਾਰ ਭਾਗ ਹਨ ਪਰ ਪ੍ਰਸ਼ਨ-ਪੱਤਰ ਦੇ ਪੰਜ ਭਾਗ ਹੋਣਗੇ। ਪਹਿਲੇ ਚਾਰ ਭਾਗਾਂ ਵਿਚ 02-02 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰੇਕ ਭਾਗ ਵਿਚੋਂ 01-01 ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਲਾਜ਼ਮੀ ਹੋਵੇਗਾ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ (08) ਅੰਕ ਹੋਣਗੇ। ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਪੰਜਵੇਂ ਭਾਗ ਵਿਚ ਸਾਰੇ ਸਿਲੇਬਸ ਵਿਚੋਂ 01-01 ਅੰਕ ਦੇ ਛੇ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ, ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ 05 ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ ਦੇਣਾ ਲਾਜ਼ਮੀ ਹੋਵੇਗਾ। ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ-ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।
  ਨੋਟ: ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ 13 ਅੰਕਾਂ ਦੀ ਹੈ, ਜੋ ਕਾਲਜ ਵੱਲੋਂ ਨਿਰਧਾਰਿਤ ਦਿਸ਼ਾ ਨਿਰਦੇਸ਼ਾਂ ਅਨੁਸਾਰ ਥਿਊਰੀ ਅੰਕਾਂ ਤੋਂ ਵੱਖਰੀ ਹੋਵੇਗੀ। ਇਸ ਪੇਪਰ ਦੇ ਕੁੱਲ ਅੰਕ 37+13 = 50 ਹਨ।

ਕੋਰਸ ਦਾ ਉਦੇਸ਼ Course Objective

- ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਸਾਹਿਤਕ ਰੁਚੀਆਂ ਪੈਦਾ ਕਰਨਾ।
- ਆਲੋਚਨਾਤਮਕ ਰੁਚੀਆਂ ਨੂੰ ਵਿਕਸਤ ਕਰਨਾ।
- ਭਾਸ਼ਾਈ ਗਿਆਨ ਵਿਚ ਵਾਧਾ ਕਰਨਾ।

ਪਾਠ-ਕ੍ਰਮ ਨਤੀਜੇ Course Outcomes (COs)

- ਵਿਦਿਆਰਥੀ ਦੀ ਸੋਚ-ਸਮਝ ਵਿਕਸਤ ਹੋਵੇਗੀ।
- ਉਸ ਅੰਦਰ ਸਾਹਿਤਕ ਰੁਚੀਆਂ ਪ੍ਰਫਲਿੱਤ ਹੋਣਗੀਆਂ।
- ਉਸ ਅੰਦਰ ਸਾਹਿਤ ਸਿਰਜਣਾ ਦੀ ਸੰਭਾਵਨਾ ਵਧੇਗੀ।
- ਉਹ ਸੰਬੰਧਿਤ ਵਿਸ਼ੇ ਦਾ ਗਹਿਨ ਅਧਿਐਨ ਕਰਨ ਦੇ ਸੁਯੋਗ ਹੋਵੇਗਾ।
- ਉਹ ਭਾਸ਼ਾਈ ਬਣਤਰ ਤੋਂ ਜਾਣੂ ਹੋਵੇਗਾ।

ਪਾਠ-ਕ੍ਰਮ

ਭਾਗ-ਪਹਿਲਾ

ਸਾਹਿਤ ਦੇ ਰੰਗ, ਡਾ. ਮਹਿਲ ਸਿੰਘ (ਸੰਪਾ.), ਰਵੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।
ਭਾਗ ਦੂਜਾ - ਵਾਰਤਕ ਅਤੇ ਰੇਖਾ-ਚਿੱਤਰ, ਡਾ. ਪਰਮਿੰਦਰ ਸਿੰਘ, ਡਾ. ਭੁਪਿੰਦਰ ਸਿੰਘ ਅਤੇ ਡਾ. ਕੁਲਦੀਪ ਸਿੰਘ ਢਿੱਲੋਂ (ਸਹਿ ਸੰਪਾ.)
(ਵਾਰਤਕ ਭਾਗ ਵਿਚੋਂ ਸਾਰ/ਵਿਸ਼ਾ-ਵਸਤੂ। ਰੇਖਾ-ਚਿੱਤਰ ਭਾਗ ਵਿਚੋਂ ਸਾਰ/ਨਾਇਕ ਬਿੰਬ)

ਭਾਗ-ਦੂਜਾ

ਇਤਿਹਾਸਿਕ ਯਾਦਾਂ
ਸ. ਸ. ਅਮੋਲ (ਸੰਪਾ.), ਪੰਜਾਬੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।
(ਨਿਬੰਧ 7 ਤੋਂ 12 ਤਕ ਸਾਰ/ ਵਿਸ਼ਾ-ਵਸਤੂ/ਸ਼ੈਲੀ)

ਭਾਗ-ਤੀਜਾ

(ੳ) ਦਫ਼ਤਰੀ ਚਿੱਠੀ ਪੱਤਰ
(ਅ) ਮੁਹਾਵਰੇ ਅਤੇ ਅਖਾਣ

ਭਾਗ-ਚੌਥਾ

(ੳ) ਸ਼ਬਦ-ਬਣਤਰ ਅਤੇ ਸ਼ਬਦ-ਰਚਨਾ - ਪਰਿਭਾਸ਼ਾ ਅਤੇ ਮੁੱਢਲੇ ਸੰਕਲਪ
(ਅ) ਸ਼ਬਦ-ਸ਼੍ਰੇਣੀਆਂ

BACHELOR OF VOCATION (B.VOC.) (SOFTWARE DEVELOPMENT)

SEMESTER-II

BPBI-1202

ਮੁਢਲੀ ਪੰਜਾਬੀ

(In Lieu of Compulsory Punjabi)

ਸਮਾਂ : 3 ਘੰਟੇ ਕ੍ਰੈਡਿਟ ਪ੍ਰਤੀ ਹਫਤਾ : 04

ਕੁੱਲ ਘੰਟੇ : 60 ਥਿਊਰੀ ਅੰਕ : 37, ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ : 13, ਕੁੱਲ ਅੰਕ : 50

ਅੰਕ-ਵੰਡ ਅਤੇ ਪ੍ਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

- ਭਾਗ ਪਹਿਲਾ ਵਿਚੋਂ ਚਾਰ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਤਿੰਨ ਪ੍ਰਸ਼ਨਾਂ ਦਾ ਉੱਤਰ ਦੇਣਾ ਲਾਜ਼ਮੀ ਹੈ। ਹਰ ਪ੍ਰਸ਼ਨ ਦੇ ਚਾਰ-ਚਾਰ ਅੰਕ ਹਨ। ਭਾਗ ਦੂਸਰਾ ਵਿਚੋਂ ਦੋ-ਦੋ ਅੰਕ ਦੇ ਪੰਜ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਸਾਰੇ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹਨ। ਭਾਗ ਤੀਸਰਾ ਵਿਚੋਂ ਚਾਰ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਲਾਜ਼ਮੀ ਹਨ। ਭਾਗ ਚੌਥਾ ਵਿਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨਾ ਹੋਵੇਗਾ।

  ਨੋਟ: ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ 13 ਅੰਕਾਂ ਦੀ ਹੈ, ਜੋ ਕਾਲਜ ਵੱਲੋਂ ਨਿਰਧਾਰਿਤ ਦਿਸ਼ਾ ਨਿਰਦੇਸ਼ਾਂ ਅਨੁਸਾਰ ਥਿਊਰੀ ਅੰਕਾਂ ਤੋਂ ਵੱਖਰੀ ਹੋਵੇਗੀ। ਇਸ ਪੇਪਰ ਦੇ ਕੁਲ ਅੰਕ 37+13 = 50 ਹਨ।

ਕੋਰਸ ਦਾ ਉਦੇਸ਼ Course Objective

- ਵਿਦਿਆਰਥੀ ਅੰਦਰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੀ ਸਮਝ ਵਿਕਸਤ ਕਰਨਾ।
- ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੇ ਵਿਆਕਰਨਕ ਪ੍ਰਬੰਧ ਸੰਬੰਧੀ ਗਿਆਨ ਕਰਾਉਣਾ।
- ਸਿਖਲਾਈ ਤੇ ਅਭਿਆਸ ਦੁਆਰਾ ਪੰਜਾਬੀ ਭਾਸ਼ਾ 'ਤੇ ਪਕੜ ਵਧਾਉਣਾ।

ਪਾਠ-ਕ੍ਰਮ ਨਤੀਜy Course Outcomes (COs)

- ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ ਬਾਰੇ ਸਮਝ ਹੋਰ ਵਿਕਸਿਤ ਹੋਵੇਗੀ।
- ਉਹ ਪੰਜਾਬੀ ਸ਼ਬਦ-ਬਣਤਰ ਦੀ ਜਾਣਕਾਰੀ ਹਾਸਿਲ ਕਰਕੇ ਭਾਸ਼ਾਈ ਗਿਆਨ ਨੂੰ ਵਿਕਸਿਤ ਕਰਨਗੇ।
- ਪੰਜਾਬੀ ਸ਼ਬਦ-ਰਚਨਾ ਸੰਬੰਧੀ ਜਾਣਕਾਰੀ ਉਨ੍ਹਾਂ ਦੇ ਗਿਆਨ ਵਿਚ ਵਾਧਾ ਕਰੇਗੀ।

ਪਾਠ-ਕ੍ਰਮ

ਭਾਗ-ਪਹਿਲਾ

ਪੰਜਾਬੀ ਸ਼ਬਦ-ਬਣਤਰ :

ਧਾਤੂ, ਵਧੇਤਰ (ਅਗੇਤਰ, ਮਧੇਤਰ, ਪਿਛੇਤਰ), ਪੰਜਾਬੀ ਕੋਸ਼ਗਤ ਸ਼ਬਦ ਅਤੇ ਵਿਆਕਰਨਕ ਸ਼ਬਦ

ਭਾਗ-ਦੂਜਾ

ਪੰਜਾਬੀ ਸ਼ਬਦ-ਪ੍ਰਕਾਰ :

(ੳ) ਸੰਯੁਕਤ ਸ਼ਬਦ, ਸਮਾਸੀ ਸ਼ਬਦ, ਦੋਜਾਤੀ ਸ਼ਬਦ, ਦੋਹਰੇ/ਦੁਹਰੁਕਤੀ ਸ਼ਬਦ ਅਤੇ ਮਿਸ਼ਰਤ ਸ਼ਬਦ

(ਅ) ਸਿਖਲਾਈ ਤੇ ਅਭਿਆਸ

ਭਾਗ-ਤੀਜਾ

ਪੰਜਾਬੀ ਸ਼ਬਦ-ਰਚਨਾ :

ਇਕ-ਵਚਨ/ਬਹੁ-ਵਚਨ, ਲਿੰਗ-ਪੁਲਿੰਗ, ਬਹੁਅਰਥਕ ਸ਼ਬਦ, ਸਮਾਨਅਰਥਕ ਸ਼ਬਦ, ਬਹੁਤੇ ਸ਼ਬਦਾਂ ਲਈ ਇਕ ਸ਼ਬਦ, ਸ਼ਬਦ ਜੁੱਟ, ਵਿਰੋਧਅਰਥਕ ਸ਼ਬਦ, ਸਮਨਾਮੀ ਸ਼ਬਦ

ਭਾਗ-ਚੌਥਾ

ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ

ਖਾਣ-ਪੀਣ, ਸਾਕਾਦਾਰੀ, ਰੁੱਤਾਂ, ਮਹੀਨਿਆਂ, ਗਿਣਤੀ, ਮੌਸਮ, ਬਾਜ਼ਾਰ, ਵਪਾਰ, ਧੰਦਿਆਂ ਨਾਲ ਸੰਬੰਧਿਤ

BACHELOR OF VOCATION (B.VOC.) (SOFTWARE DEVELOPMENT)

SEMESTER-II

BPHC-1204: PUNJAB HISTORY & CULTURE (C 321 TO 1000 A.D.)

(Special Paper in lieu of Punjabi compulsory)
(For those students who are not domicile of Punjab)

Time: 3 Hours **Total. Marks: 50**
Credit Hours (per week):4 **Theory: 37**
Total Hours: 60 **Internal Assessment: 13**

Instructions for the Paper Setter:

The question paper consists of five units: I, II, III, IV and V. Units I, II, III and IV will have two questions each. Each question carries 8 marks. The students are to attempt one question from each unit approximately in 800 words. Unit-V consists of 7 short answer type questions to be set from the entire syllabus. Students are to attempt any 5 questions in about 20 words each. Each question carries 1 mark.

Note: The examiner is to set the question paper in two languages: English & Hindi.

Course Objectives:

1. The main objective of this course is to educate the students who are not domicile of the Punjab about the history and culture of the Ancient Punjab.
2. It is to provide them knowledge about the social, economic, religious, cultural and political life of the peopleof the Punjab during the rule of various dynasties such as The Mauryans, The Khushans, The Guptas, The Vardhanas and other ancient ruling dynasties of the period under study.

UNIT-I

1. Punjab under Chandragupta Maurya and Ashoka.
2. The Kushans and their Contribution to the Punjab.

UNIT-II

3. The Punjab under the Gupta Emperors.
4. The Punjab under the Vardhana Emperors

UNIT-III

5. Political Developments 7th Century to 1000 A.D.
6. Socio-cultural History of Punjab from 7th Century to 1000 A.D.

UNIT-IV

7. Development of languages and Literature.
8. Development of art & Architecture.

References:-

1. L. Joshi (ed), History and Culture of the Punjab, Part-I, Patiala, 1989 (3rd edition)
2. L.M. Joshi and Fauja Singh (ed), History of Punjab, Vol.I, Patiala 1977.
3. Budha Parkash, Glimpses of Ancient Punjab, Patiala, 1983.
4. B.N. Sharma, Life in Northern India, Delhi. 1966.

Course Outcomes:

After completion of the course, the students will be able to learn:

CO-1 The history and culture of the Punjab in Ancient Period.
CO-2 Social, economic, religious, cultural and political life of Ancient Indian dynasties.
CO-3 Political developments from 7th century to1000AD.
CO-4 Socio-cultural history of the Punjab from 7th century to1000AD.
CO-5 Language, literature, art and architecture of Ancient Punjab.

BACHELOR OF VOCATION (B.VOC.) (SOFTWARE DEVELOPMENT)
SEMESTER-II
ZDA121: DRUG ABUSE: PROBLEM, MANAGEMENT AND PREVENTION
DRUG ABUSE: MANAGEMENT AND PREVENTION
(Compulsory for all Under Graduate Classes)

Credit Hours (per week): 1.5 hrs.
Total Hours: 22.5 hrs.
Max. Marks: 50

Instructions for the Paper Setters:

Section–A: (15 Marks): It will consist of five short answer type questions. Candidates will be required to attempt three questions, each question carrying 05 marks. Answer to any of the questions should not exceed two pages.

Section–B: (20 Marks) It will consist of four essay type questions. Candidates will be required to attempt two questions, each question carrying 10 marks. Answer to any of the questions should not exceed four pages.

Section–C: (15 Marks) It will consist of two questions. Candidate will be required to attempt one question only. Answer to the question should not exceed 5 pages.

Course Objectives:

The course aim is to

1. Describe the role of family in the prevention of drug abuse.
2. Describe the role of school and teachers in the prevention of drug abuse.
3. Emphasize the role of media and educational and awareness program.
4. Provide knowhow about various legislation and Acts against drug abuse.

UNIT-I

- **Prevention of Drug abuse**

  Role of family: Parent child relationship, Family support, Supervision, Shaping values, Active scrutiny.

UNIT-II

- **School:** Counseling, Teacher as role-model, Parent-Teacher-Health Professional Coordination, Random testing on students.

UNIT-III

- **Controlling Drug Abuse**

  Media: Restraint on advertisements of drugs, advertisements on bad effects of drugs, Publicity and media, Campaigns against drug abuse, Educational and Awareness Program

UNIT-IV

- **Legislation:** NDPS Act, Statutory warnings, Policing of Borders, Checking Supply/Smuggling of Drugs, Strict enforcement of laws, Time bound trials.

References:

1. Extent, Pattern and Trend of Drug Use in India, Ministry of Social Justice and Empowerment, Government of India, 2004.
2. Gandotra, R. and Randhawa, J.K. 2018. ਡਰੱਗਜ਼ ਦੁਰਵਰਤੋਂ (ਨਸ਼ਾਖੋਰੀ) ਪ੍ਰਬੰਧਨ ਅਤ ਰੋਕਥਾਮ। Kasturi Lal & Sons, Educational Publishers, Amritsar- Jalandhar.
3. Inciardi, J.A. 1981. The Drug Crime Connection. Beverly Hills: Sage Publications.
4. Modi, Ishwar and Modi, Shalini (1997) Drugs: Addiction and Prevention, Jaipur: Rawat Publication.
5. Randhawa, J.K. and Randhawa, Samreet 2018. Drug Abuse-Management and Prevention. Kasturi Lal & Sons, Educational Publishers, Amritsar- Jalandhar.
6. Sain, Bhim 1991, Drug Addiction Alcoholism, Smoking obscenity New Delhi: Mittal Publications.
7. Sandhu, Ranvinder Singh, 2009, Drug Addiction in Punjab: A Sociological Study. Amritsar: Guru Nanak Dev University.
8. Singh, Chandra Paul 2000. Alcohol and Dependence among Industrial Workers: Delhi: Shipra. 9. World Drug Report 2011, United Nations office of Drug and Crime.
10. World Drug Report 2010, United Nations office of Drug and Crime

Course Outcomes:

The students will be able to:

CO-1. Understand the importance of family and its role in drug abuse prevention.
CO-2. Understand the role of support system especially in schools and inter-relationships between students, parents and teachers.
CO-3. Understand impact of media on substance abuse prevention.
CO-4. Understand the role of awareness drives, campaigns etc. in drug abuse management.
CO-5 Learn about the Legislations and Acts governing drug trafficking and Abuse in India.

BACHELOR OF VOCATION (B.VOC.) (SOFTWARE DEVELOPMENT)
SEMESTER-II
BVSD 124: Internet Applications

Time: 3 Hrs. **Max. Marks: 50**
Credit Hours (per week):4 **Theory Marks: 37**
Total Hours: 60 **Internal Assessment Marks: 13**

Instructions for the Paper Setters: - Medium of Examination is English Language.
Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry 1.5 marks with answer to each question up to 10 lines in length. The total weightage being 09 marks.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 07 marks. The total weightage of this section shall be 14 marks.
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 07 marks. The total weightage of this section shall be 14 marks.

Course Objectives:

1.	The elementary goal of this course is to provide full exposure regarding usage of internet along with working model of Internet.
2.	Providing in-depth knowledge of various internet protocols and their working.

UNIT–I

Introduction: About internet and its working, business use of internet, services offered by internet,
evaluation of internet, internet service provider (ISP), windows environment for dial up networking (connecting to internet), audio on internet, internet addressing (DNS) and IP addresses).

E–Mail: Concept, Advantage and disadvantage, structure of an e–mail message, working of e–mail (sending and receiving messages), managing e–mail (creating new folder, deleting messages, forwarding messages, filtering messages) Implementation of outlook express.
Internet Protocol: Introduction, file transfer protocol (FTP), Gopher, Telnet, other protocols like HTTP and TCP/IP.

UNIT-II

WWW: Introduction, working of WWW, Web browsing (opening, viewing, saving and printing a web page and bookmark).

Intranet and Extranet Introduction, application of intranet, business value of intranet, working of intranet, role of extranet, working of extranet, difference between intranet and extranet.

Search Engine: About search engine, component of search engine, working of search engine, difference between search engine and web directory.

News Group: Basic concepts of newsgroup, connecting to a news server, subscribing to newsgroup, organization of articles, reading messages, posting replies and new messages, managing newsgroup and messages.

References:

1. Internet and its Applications by Ackerman.
2. Internet – The Complete Reference.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Completely know how to use internet effectively such as internet surfing, browsing etc.
CO-2.	Become able to use all features of email facilities such as creating, sending, receiving, attachments, replying emails etc.
CO-3.	Opt website development field in well manner after studying this course.
CO-4.	Knowledge of Network topologies will also make able students to make career in networking field.
CO-5.	Developing ability in students to design basic to moderate web-sites in HTML.

BACHELOR OF VOCATION (B.VOC.) (SOFTWARE DEVELOPMENT)
SEMESTER-II
BVSD 125: Data Structures

Time: 3 Hrs. **Max. Marks: 50**
Credit Hours (per week):4 **Theory Marks:37**
Total Hours: 60 **Internal Assessment Marks: 13**

Instructions for the Paper Setters: - Medium of Examination is English Language.
Instructions for Paper Setters:

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry 1.5 marks with answer to each question up to 10 lines in length. The total weightage being 09 marks.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 07 marks. The total weightage of this section shall be 14 marks.

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 07 marks. The total weightage of this section shall be 14 marks.

Course Objectives:

1.	To Present the basic concepts of data structures and algorithms
2.	To provide practical base knowledge to students in this area.
3.	To teach structured memory management mechanisms of data for an easy access.
4.	To teach students the designing and implementation of various basic and advanced data structures.
5.	To introduce various techniques for representation of the data in the real world.
6.	To enhance the logical ability.

.UNIT-I

Basic Data Structure: Introduction to Data Structure, Common Operations on Data Structures, Algorithm Complexity, Big O Notation, Time – Space trade off between Algorithms.

Arrays: Define Array, Representing Arrays in Memory, Various Operations on Linear Arrays, Linear Search and Binary Search

Linked Lists: Types of Linked Lists, Representing Linked Lists in Memory, Advantages of using Linked Lists over Arrays, Various Operations on Linked Lists.

Stacks: Description of STACK structure, Implementation of Stack using Arrays and Linked Lists, Push and Pop operations of Stack, Applications of Stacks – Converting Arithmetic expression from infix notation to polish and their subsequent evaluation

UNIT-II

Queues: Description of queue structure, Implementation of queue using arrays and linked lists, Insertion and Deletion operations in Circular Queue, description of priorities of queues, dequeues.

Trees: Description of Tree Structure and its Terminology, Binary Trees and Binary Search trees and their representation in Memory

Graphs: Description of Graph Structure, Implement Graphs in Memory using Adjacency Matrix and Adjacency list, BSF and DFS traversal of the graph

Sorting techniques: Sorting Algorithms, Bubble Sort, Insertion Sort, Selection Sort, Merge Sort

References:

1. Seymour Lipschutz, Theory and Problems of Data Structures, Schaum's Outline Series, McGraw Hill Company.
2. Tanenbaum, Data Structure using C.

Course Outcomes:

The students, after the completion of the course, are expected to:

CO-1.	Use data structures effectually to solve practical problems.
CO-2.	Implement effective programs that employ efficient algorithms.
CO-3.	Choose basic data structures and algorithms for realization of simple programs or program parts.
CO-4.	To debug the programs, recognize needed basic operations with data structures.

BACHELOR OF VOCATION (B.VOC.) (SOFTWARE DEVELOPMENT)
SEMESTER-II
BVSD 126: Object Oriented Programming

Time: 3 Hrs. **Max. Marks: 50**
Credit Hours (per week):4 **Theory Marks:37**
Total Hours: 60 **Internal Assessment Marks: 13**

Instructions for the Paper Setters: - Medium of Examination is English Language.
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry 1.5 marks with answer to each question up to 10 lines in length. The total weightage being 09 marks.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from UNIT-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 07 marks. The total weightage of this section shall be 14 marks.
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from UNIT-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 07 marks. The total weightage of this section shall be 14 marks.
Course Objective:

1.	The objective of the course is to develop programming skills of students, using object oriented programming concepts.
2.	Learn the concept of class and object using C++ and develop classes for simple applications.

UNIT-I

Object-Oriented Programming Concepts: Introduction, comparison between procedural programming paradigm and object-oriented programming paradigm, basic concepts of object-oriented programming, Data Types, Operators and Control Structures.
Standard Input/output: Concept of streams, hierarchy of console stream classes, input/output using cin (>>) and cout (<<), formatting output using ios class functions, flags and manipulators.
Functions: Defining and accessing function, passing arguments to functions, inline functions, static function and storage classes.
Classes and Objects: Specifying a class, creating class objects, accessing class members, access specifiers, static members, friend function, empty classes and nested classes**.**

UNIT-II

Pointers and Dynamic Memory Management: dynamic memory management using *new* and *delete* operators, pointer to an object, *this* pointer, pointer related problems - dangling/wild pointers, null pointer, memory leak and allocation failures**.**

Constructors and Destructors: Need for constructors and destructors, Default Constructor, Parameter Constructor and Copy Constructor, destructors, constructors and destructors with static members.

Inheritance: Introduction, defining derived classes, types of inheritance: Multiple, Multilevel, Hybrid and Hierarchical Inheritance, virtual base class, overriding member functions,

Operator Overloading: Overloading operators, rules for overloading operators, overloading of various operators: unary and binary operators, type conversion: implicit and Explicit.

Polymorphism: Concept of binding - early binding and late binding, function overloading, virtual functions, pure virtual functions, abstract classes, virtual destructors.

References:

1. Lafore R., Object Oriented Programming in C++, Waite Group.
2. E. Balagurusamy, Object Oriented Programming with C++, Tata McGraw Hill.
3. Bjarne Stroustrup, The C++ Programming Language, Addison Wesley.
4. Herbert Schildt, The Complete Reference to C++ Language, McGraw Hill-Osborne.

Course Outcome (Cos):

On Completing the course, the students will be able to:

CO-1.	Describe the procedural and object-oriented paradigm with concepts of streams, classes, functions, data and objects.
CO-2.	Understand dynamic memory management techniques using pointers, constructors, destructors, etc
CO-3.	Describe the concept of function overloading, operator overloading, virtual functions and polymorphism.
CO-4.	Classify inheritance with the understanding of early and late binding, usage of exception handling, generic programming.
CO-5.	Demonstrate the use of various OOPs concepts with the help of programs.

BACHELOR OF VOCATION (B.VOC.)
(SOFTWARE DEVELOPMENT)
SEMESTER-II

BVSD 127P: Lab – I: Programming in C++

Time: 3 Hrs. **Max. Marks: 75**
Credit Hours (per week):4 **Practical Marks: 5**
Total Hours: 60 **Internal Assessment Marks: 19**

Course Objectives:

1.	The primary goal is to understand the structured and procedural programming.
2.	To understand code organization.
3.	To learn problem solving Techniques.
4.	To learn to break large problem into smaller parts, writing each part as a module.

Practical based on Programming in C++

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Enhance skill on Problem Solving by constructing algorithms.
CO-2.	Demonstrate the use of Strings and String Handling Functions.
CO-3.	Ability to work with textual information, characters and strings.
CO-4.	Ability to work with arrays.
CO-5.	Ability to write diversified solutions using C language.

BACHELOR OF VOCATION (B.VOC.) (SOFTWARE DEVELOPMENT)
SEMESTER-II

BVSD 128P: Lab – II: Practical based on Data Structures

Time: 3 Hrs. **Max. Marks: 75**
Credit Hours (per week):4 **Practical Marks:56**
Total Hours: 60 **Internal Assessment Marks: 19**

Course Objective:

1.	To provide the knowledge of basic data structures and their implementations.
2.	To understand importance of data structures in contest of writing efficient programs.
3.	To implement stack, queue, linked list, tree and graph data structures.

Practical based on Data Structure

Course Outcome:

On Completing the course, the students will be able to:

CO-1.	Able to learn the basic types of data structures, implementation and applications.
CO-2.	Able to use linear and non-linear data structure like stacks, queues, linked list etc.
CO-3.	Implement various searching and sorting algorithms
CO-4.	Handle operations like searching, insertion, deletion, traversing mechanism etc. on various data structures.
CO-5.	Develop programming skills which require solving given problems.

BACHELOR OF VOCATION (B.VOC.) (SOFTWARE DEVELOPMENT)

Semester – III

Sr. No.	Paper Code	Paper Name	Marks				Page No.
			Theory	Internal Assessment	Practical	Total	
1	BVSD-231	Database System	37	13		50	484-485
2	BVSD-232	Programming in Python	37	13		50	486-487
3	BVSD-233	Software Engineering Methodology	37	13		50	488-489
4	BVSD-234P	Lab I: Lab based on SQL & PL/SQL		13	37	50	490
5	BVSD-235P	Lab II: Lab based on Programming in Python		13	37	50	491
6	BVSD-236P	Minor Project: Software Module based on Web Technology/Database/ Programming Language		38	112	150	492
7		* Environmental Studies	37	13		50	493-495

BACHELOR OF VOCATION (B.VOC.) (SOFTWARE DEVELOPMENT)

SEMESTER-III
BVSD-231: DATABASE SYSTEM

Time: 3 Hours **Max. Marks: 50**
Credit Hours (per week):4 **Theory Marks: 37**
Total Hours: 60 **Theory Internal Assessment Marks: 13**

Instructions for the Paper Setters: - Medium of Examination is English Language.
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry 1.5 marks with answer to each question up to 10 lines in length. The total weightage being 09 marks.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from UNIT-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 07 marks. The total weightage of this section shall be 14 marks.
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from UNIT-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 07 marks. The total weightage of this section shall be 14 marks.

Course Objectives:

1.	To get acquaint students with the basics of DBMS, different Architectural Models for DBMS, Normalization of data, Concurrency control problems and its management, Protection, Security and recovery aspects of databases along with practical knowledge of databases using SQL and PL/SQL.
2.	The key goal is to prepare students for a professional career in the field of data administration and database design.
3.	To get acquaint students with basics of database security and administration.
4.	To get acquaint students with good knowledge of DBMS. During the course, students will learn about database design and database handling activities.

Unit I

Basic Concepts: Database, Database system, Database management system, Data independence, advantages and disadvantages, 3 level architecture and mapping DBMS vs. File System, DBA's Role, RDBMS.
Data Models: Relational model, Hierarchical model, Network model, comparison of these model, An overview of the E/R Model, E/R diagrams, Database design with the E/R model
Normalization: Introduction to Normalization, Need of Normalization, various forms of Normalization (1NF, 2NF, 3NF, BCNF)
SQL: Introduction, Data Definition Language (DDL), Data Manipulation Language (DML), Data Control Language (DCL) statements, Views, Sub–queries, Access Rights.

Unit II

Transaction Management and Concurrency Control: Introduction to Transaction Processing, Properties of Transactions, Concurrency Control, purpose of concurrency control, Techniques for concurrency control,

Database Recovery of database: Introduction, Need for Recovery, Recovery Techniques.

Database Security: Introduction, Threats, Counter Measures.

References:

1. C.J. Date: *An Introduction of Database System*", The Systems Programming Series,
   6/Ed, Addison-Wesley Publishing Company, Inc., 1995.
2. Silberschatz, Korth & Sudarshan, "*Database System Concepts*", Third Ed., McGraw
   Hill International Editions, Computer Science Series-1997.
3. Parteek Bhatia and Gurvinder Singh, "Simplified Approach to DBMS", Kalyani Publishers, 2010.
4. Ivan Bayross, "SQL/PLSQL: The Programming Language of Oracle, 3rd Revised Edition, 2006.

Course Outcomes (COs):

On Completing the course, the students will be able to:

CO-1.	On successful completion of this subject the students have the knowledge of databases and their designs.
CO-2.	Students would be capable of developing various concepts of relational data model, ER model, relational database designs.
CO-3.	Understanding a concept of database design.
CO-4.	They can also learn to make Views, Queries and Sub-queries.
CO-5.	Ability to handle the various forms of Normalization.

BACHELOR OF VOCATION (B.VOC.) (SOFTWARE DEVELOPMENT)

SEMESTER-III
BVSD-232: Programming in Python

Time: 3 Hours **Max. Marks: 50**
Credit Hours (per week):4 **Theory Marks: 37**
Total Hours: 60 **Theory Internal Assessment Marks: 13**

Instructions for the Paper Setters: - Medium of Examination is English Language.
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry 1.5 marks with answer to each question up to 10 lines in length. The total weightage being 09 marks.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from UNIT-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 07 marks. The total weightage of this section shall be 14 marks.
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from UNIT-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 07 marks. The total weightage of this section shall be 14 marks.
Course Objectives:

1.	It aims to familiarize students with Computational Problem-Solving process in better way.
2.	Develops strong logics to solve computation problems in data science.

UNIT-I

Introduction to Python: Process of Computational Problem Solving, Python Programming Language
Data and Expressions: Literals, Variables and Identifiers, Operators, Expressions, Statements and Data Types
Control Structures: Boolean Expressions (Conditions), Logical Operators, Selection Control, Nested conditions, Debugging
Lists: List Structures, Lists (Sequences) in Python, Iterating Over Lists (Sequences) in Python
Functions: Fundamental Concepts, Program Routines, Flow of Execution, Parameters & Arguments
Iteration: While statement, Definite loops using For, Loop Patterns, Recursive Functions, Recursive Problem Solving, Iteration vs. Recursion

UNIT-II

Dictionaries: Dictionaries and Files, Looping and dictionaries, Advanced text parsing
Files: Opening Files, Using Text Files, String Processing, Exception Handling
Objects and Their Use: Introduction to Object Oriented Programming
Modular Design: Modules, Top-Down Design, Python Modules
Using Databases and SQL: Database Concepts, SQLite Manager Firefox Add-on, SQL basic summary, Basic Data modeling, Programming with multiple tables

References:

1. Python for Informatics, Charles Severance, version 0.0.7
2. Introduction to Computer Science Using Python: A Computational Problem-Solving Focus, Charles Dierbach, Wiley Publications, 2012, ISBN : 978-0-470-91204-1
3. Introduction To Computation And Programming Using Python, GUTTAG JOHN V, PHI, 2014, ISBN-13: 978-8120348660
4. Introduction to Computating& Problem Solving Through Python, Jeeva Jose and Sojan P. Lal,Khanna Publishers, 2015, ISBN-13: 978-9382609810
5. Introduction to Computing and Programming in Python, Mark J. Guzdial, Pearson Education, 2015, ISBN-13: 978-9332556591
6. Fundamentals of Python by Kenneth Lambert, Course Technology, Cengage Learning , 2015
7. Learning Python by Mark Lutz, 5th Edition, O'Reilly Media, 2013

.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Strong Knowledge and Understanding of Python Programming Language.
CO-2.	Students will become capable to handle computational and data science problems efficiently.
CO-3.	Students will know theoretical as well as practical concepts of programming thoroughly.
CO-4.	Develops capability in students to make successful career in Data analysis and Data sciences.
CO-5.	Provides ability to become freelancer software developer in python.

BACHELOR OF VOCATION (B.VOC.) (SOFTWARE DEVELOPMENT)

SEMESTER-III

BVSD-233: SOFTWARE ENGINEERING METHODOLOGY

Time: 3 Hours **Max. Marks: 50**
Credit Hours (per week):4 **Theory Marks: 37**
Total Hours: 60 **Theory Internal Assessment Marks: 13**

Instructions for the Paper Setters: - Medium of Examination is English Language.

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry 1.5 marks with answer to each question up to 10 lines in length. The total weightage being 09 marks.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from UNIT-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 07 marks. The total weightage of this section shall be 14 marks.

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from UNIT-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 07 marks. The total weightage of this section shall be 14 marks.

Course Objectives:

1.	To inculcate in students different concepts of software engineering principles.
2.	To produce efficient, reliable, robust and cost- effective software solutions.
3.	Ability to develop, maintain and evaluate large-scale software systems

UNIT-I

Introduction to Software Engineering: Definition, Software characteristics, Software components, Software crisis, Software Applications, Software Engineering Paradigms, Software Development Life Cycle

Software Project Management: Introduction, Project planning, metrics for project size estimation, project estimation techniques, Cost estimation, COCOMO model, Project scheduling and milestones

Software Requirement Specification (SRS): Definition, Problem analysis, structuring information, Data flow diagram and data dictionary, structured analysis, Characteristics and component of (SRS), Metrics of SRS

Software Design and coding: Introduction, classification of design activities and design Methodologies, Cohesion and Coupling, Verification and validation, approaches to software design, introduction to various design approaches, Structured programming, Coding standards and guidelines.

UNIT-II

Software Testing and metrics: Software Testing, levels of testing, Test case design, Design metrics, Coding metrics, Technical metrics, testing metrics.

Software maintenance: Definition need and types of Software maintenance

Reverse Engineering: Need of reverse engineering, Reverse engineering process, Reverse engineering to understand data, Reverse engineering user interfaces, Tools for reverse engineering.
Software Reuse: Software Reuse Success Factors, Reuse Driven Software Engineering in a Business, Use case Components, Object Components, Layered Architecture

References:

1. Pressman: Software Engineering: A Practitioner's Approach, 3rd Ed., TMH 2004
2. Flecher and Hunt: Software Engineering and CASE: Bridging and Culture G
3. An Integrated Approach to Software Engineering, Second Edition, Pankaj Jalote
4. Fundamentals of Software Engineering, Rajib Mall

.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Decompose the given project in various phases of a lifecycle.
CO-2.	Choose appropriate process model depending on the user requirements.
CO-3.	Perform various life cycle activities like Analysis, Design, Implementation, Testing and Maintenance.
CO-4.	Know various processes used in all the phases of the product.
CO-5.	Apply the knowledge, techniques, and skills in the development of a software product.

BACHELOR OF VOCATION (B.VOC.) (SOFTWARE DEVELOPMENT)

SEMESTER-III
BVSD-234P: LAB-I: SQL & PL/SQL

Time: 3 Hrs. **Max. Marks: 50**
Credit Hours (per week):4 **Practical Marks: 37**
Total Hours: 60 **Internal Assessment Marks: 13**

Course Objectives:

1.	Explore the differences between SQL and PL/SQL.
2.	Examine the characteristics of PL/SQL and how it is used to extend and automate SQL to administer the Oracle database.
3.	This course culminates with a project that challenges students to program, implement, and demonstrate a database solution for a business or organization.

Practical Lab based on SQL and PL/SQL

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	On successful completion of this subject the students have the knowledge of databases and their designs.
CO-2.	Students would be capable of developing various concepts of relational data model, ER model, relational database designs.
CO-3.	Understanding a concept of database design.
CO-4.	They can also learn to make Views, Queries and Sub-queries.
CO-5.	Ability to handle the various forms of Normalization.

BACHELOR OF VOCATION (B.VOC.) (SOFTWARE DEVELOPMENT)
SEMESTER–III
BVSD-235P: LAB – II: Programming in Python

Time: 3 Hrs. **Max. Marks: 50**
Credit Hours (per week):4 **Practical Marks: 37**
Total Hours: 60 **Internal Assessment Marks: 13**

Course Objectives:

1.	It aims to develop practical skills in students to solve computational problems.
2.	Provides hands on practice to apply all theoretical concepts in python.
3.	Strengthens the programming logics by developing programs of different problems from tuples, dictionaries, lists and arrays etc.

Practical based on Programming in Python

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Provides strong and in-depth applications of python programming language concepts.
CO-2.	Students will be capable to solve computational and data science problems efficiently.
CO-3.	Students will understand how to apply theoretical concept to design solution of any problem in right way.
CO-4.	Develops capability in students to make successful career in Data analysis and Data sciences.
CO-5.	Provides ability to get placement in any IT company or become freelancer software developer in python.

BACHELOR OF VOCATION (B.VOC.) (SOFTWARE DEVELOPMENT)
SEMESTER–III
BVSD-236P: MINOR PROJECT

Time: 3 Hrs. **Max. Marks: 150**
Credit Hours (per week):4 **Project Marks: 112**
Total Hours: 60 **Internal Assessment Marks: 38**

Course Objectives:

1.	Understand the web technologies to create adaptive web pages for the web application.
2.	Use of CSS to implement a variety of presentation effects in the web application.
3.	Know the concept and implementation of cookies as well as related privacy concerns.
4.	Develop a sophisticated web application that employs the MVC architecture.

Minor Project: Software Module based on Web Technology/Database/ Programming Language.

General Instructions:

1. The Software Module of the Minor Project shall be submitted to the College/Institute till 15th November.
2. The minor project shall be developed in groups, consisting of at most two students in a group.
3. The evaluation of the Minor Project (Software Module) shall be done by one external examiner appointed by the University and one internal examiner from College (as per other practical examination)

Course Outcomes (COs):

On Completing the course, the students will be able to:

CO-1.	Integrate frontend and backend web technologies in distributed systems.
CO-2.	Facilitate interface between frontend and backend of a web application
CO-3.	Debug, test and deploy web applications on different web servers.
CO-4.	Migrate the web applications to the other platforms like .Net technologies.
CO-5.	To develop and deploy real time web applications in web servers and in the cloud and extend this knowledge to .Net platforms.

BACHELOR OF VOCATION (B.VOC.) (SOFTWARE DEVELOPMENT)

Course code: ESL–221
Course Title: ENVIRONMENTAL STUDIES–I (COMPULSORY)

Credit Hours (Per Week): 2
Total Hours: 30
Maximum Marks: 50 Marks

Instructions for Paper Setters: The question paper will consist of three sections. Candidate will be required to attempt all the sections. Each unit of the syllabus should be given equal weightage of marks. Paper to be set in English, Punjabi and Hindi.
Section–A: (16 Marks): It will consist of five short answer type questions. Candidates will be required to attempt four questions, each question carrying four marks. Answer to any of the questions should not exceed two pages.
Section–B: (24 Marks): It will consist of five questions. Candidates will be required to attempt four questions, each question carrying six marks. Answer to any of the questions should not exceed four pages.
Section–C: (10 Marks): It will consist of two questions. Candidate will be required to attempt one question (carrying ten marks) only. Answer to the question should not exceed 5 pages.

Course Objectives

CO-1	The main goal of Environmental studies is to create the environmental awareness to create a safe, green and sustainable environment.
CO-2	To make students aware about the importance of ecosystem, types of ecosystem, energy flow in an ecosystem, ecological succession, food chain and food web.
CO-3	To make students aware of water conservation, global warming, consumerism and waste products. and, also about the environmental protection acts.
CO-4	Role of National Service Scheme (NSS). Health and hygiene.

UNIT-I

The Multidisciplinary Nature of Environmental Studies:

- Definition, scope & its importance.
- Need for public awareness.

Natural Resources:

- Natural resources and associated problems:

a) Forest Resources: Use of over exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
b) Water Resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
c) Mineral Resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

d) Food Resources: World food problems, change caused by agriculture and overgrazing, effects or modern agriculture, fertilizer-pesticide problem, salinity, case studies.

e) Energy Resources: Growing of energy needs, renewable and non-renewable energy resources, use of alternate energy sources, case studies.

iv) **f) Land Resources**: Land as a resource, land degradation, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

UNIT-II

Ecosystem:

- Concept of an ecosystem.
- Structure and function of an ecosystem.
- Producers, consumers and decomposers.
- Energy flow in the ecosystem.
- Ecological succession.
- Food chains, food webs and ecological pyramids.

Introduction, types, characteristic features, structure and function of the following ecosystems:

a. Forest ecosystem

b. Grassland ecosystem

c. Desert ecosystem

d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

UNIT-III

Social Issues and Environment:

From unsustainable to sustainable development.

Urban problems related to energy.

Water conservation, rain water harvesting, watershed management.

Resettlement and rehabilitation of people; its problems and concerns. Case studies.

Environmental ethics: Issues and possible solutions.

Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocause. Case studies.

Wasteland reclamation.

Consumerism and waste products.

Environmental Protection Act:

- Air (prevention and Control of Pollution) Act.
- Water (prevention and Control of Pollution) Act.
- Wildlife Protection Act.
- Forest Conservation Act.

Issues involved in enforcement of environmental legislation.

Public awareness.

UNIT-IV

National Service Scheme

- **Introduction and Basic Concepts of NSS:** History, philosophy, aims & objectives of NSS; Emblem, flag, motto, song, badge etc.; Organizational structure, roles and responsibilities of various NSS functionaries.
- **Health, Hygiene & Sanitation:** Definition, needs and scope of health education; Food and Nutrition; Safe drinking water, water borne diseases and sanitation (Swachh Bharat Abhiyan); National Health Programme; Reproductive health.

References/Books:

1. Agarwal, K. C. 2001. Environmental Biology, Nidhi Publications Ltd. Bikaner.
2. Bharucha, E. 2005. Textbook of Environmental Studies, Universities Press, Hyderabad.
3. Down to Earth, Centre for Science and Environment, New Delhi.
4. Jadhav, H. & Bhosale, V. M. 1995. Environmental Protection and Laws. Himalaya Pub.
5. Joseph, K. and Nagendran, R. 2004. Essentials of Environmental Studies, Pearson Education (Singapore) Pte. Ltd., Delhi.
6. Kaushik, A. & Kaushik, C. P. 2004. Perspective in Environmental Studies, New Age International (P) Ltd, New Delhi.
7. Miller, T. G. Jr. 2000. Environmental Science, Wadsworth Publishing Co.
8. Sharma, P. D. 2005. Ecology and Environment, Rastogi Publications, Meerut.
9. Booklet on Safe Driving. Sukhmani Society (Suvidha Centre), District Court Complex, Amritsar
10. Kanta, S., 2012. Essentials of Environmental Studies, ABS Publications, Jalandhar.

Course Outcomes

CO-1	To learn about the sustainable environment.
CO-2	To gain the knowledge ecosystem and its functioning.
CO-3	To know about the water conservation programs like rain water harvesting and water shedding. and, to gain knowledge of environmental (air, water and pollution) protections acts.
CO-4	To know about the role and importance of NSS– a volunteer organization, in making up a better environment and to maintain better health and hygiene.

BACHELOR OF VOCATION (B.VOC.) (SOFTWARE DEVELOPMENT)

Semester – IV

Sr. No.	Paper Code	Paper Name	Marks				Page No.
			Theory	Internal Assessment	Practical	Total	
1	BVSD-241	Open Source Software	37	13		50	497-498
2	BVSD-242	Information Security	37	13		50	499-500
3	BVSD-243	Operating System	37	13		50	501-502
4	BVSD-244P	Lab I: Practical based on Android Development		25	75	100	503
5	BVSD-245P	Lab II: Open Source Software Tool		19	56	75	504
6	BVSD 246P	Lab III: Practical based on ASP.Net using C#		19	56	75	505
7		* Environmental Studies	37	13		50	506-508

*** Marks of Paper EVS will not be included in Grand Total.**

BACHELOR OF VOCATION (B.VOC.) (SOFTWARE DEVELOPMENT)
SEMESTER–IV
BVSD-241: OPEN SOURCE SOFTWARE

Time: 3 Hours **Max. Marks: 50**
Credit Hours (per week): 4 **Theory Marks: 37**
Total Hours: 60 **Theory Internal Assessment Marks: 13**

Instructions for the Paper Setters:- Medium of Examination is English Language.

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry 1.5 marks with answer to each question up to 10 lines in length. The total weightage being 09 marks.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from UNIT-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 07 marks. The total weightage of this section shall be 14 marks.
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from UNIT-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 07 marks. The total weightage of this section shall be 14 marks.
Course Objectives:

1.	The objectives of this course are to introduce students to open source software. Open source software provides the facility to students to use pre-existing code to improve the software and even come up with their own innovations.
2.	Students will study common open source software licenses, open source project structure, distributed team software development, and current events in the open source world.
3.	Open source provides great learning opportunities for new Students. Students will also work on an open source project and will be expected to make a significant contribution.
4.	Open source comes with a built-in community that continuously modifies and improves the source code.

UNIT-I

Open Source Software: Introduction to Open Source Software, Need of Open Source Software, Advantages of Open Source Software, Application of Open Source Software, Categories of Open Source Software and Specific Characteristics of OSS.
Organization and Management of OSS: OSS development Process, Taboos and norms in OSS development, The OSS development life cycle
Development of OSS: Methodology and languages used to develop open source products,

Cross Platform code

Software and Intellectual Property Rights: Basic Principles of Copyright Law, Contracts, Patents, Licenses, Issues with copyrights and patents, Open-Source Software Licensing

UNIT -II

Open-source operating systems: LINUX: Introduction, General Overview, Kernel Mode and user mode, Process, Advanced Concepts, Scheduling, Personalities, Cloning, Signals, Development with Linux.

Open-Source Database: MYSQL: Introduction, setting up account, starting, terminating and writing your own SQL programs, Record selection Technology, working with strings, Date and Time, Sorting Query Results, Generating Summary, working with metadata Using sequences, MYSQL and Web.

References:

1. Joseph Feller & Brian Fitzgerald, Understanding Open Source Software Development, Pearson Education Limited, 2002.
2. Paul Kavanagh, Open Source Software: Implementation and Management, Elsevier Digital Press, 2004.
3. Remy Card, Eric Dumas and Frank Mevel, "The Linux Kernel Book", Wiley Publications, 2003
4. Steve Suchring, "MySQL Bible", John Wiley, 2002
5. Joseph Feller, Perspectives on Free and Open Source Software, MIT Press Books, 2005.
6. Chris Dibona, Danese Cooper, Mark Stone, Open Sources 2.0, The Continuing Evolution, O' Reilly, 2006

Course Outcomes:

At the end of this course student has:

CO-1.	Ability to install and run open-source operating systems.
CO-2.	Ability to gather information about Free and Open Source Software projects from software releases and from sites on the internet.
CO-3.	Ability to build and modify one or more Free and Open Source Software packages.
CO-4.	Ability to use a version control system and to interface with version control systems used by development communities.
CO-5.	Ability to contribute software to and interact with Free and Open Source Software development projects.

BACHELOR OF VOCATION (B.VOC.) (SOFTWARE DEVELOPMENT)
SEMESTER–IV
BVSD-242: INFORMATION SECURITY

Time: 3 Hours **Max. Marks: 50**
Credit Hours(per week): 4 **Theory Marks: 37**
Total Hours: 60 **Theory Internal Assessment Marks: 13**

Instructions for the Paper Setters:- Medium of Examination is English Language.

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry 1.5 marks with answer to each question up to 10 lines in length. The total weightage being 09 marks.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from UNIT-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 07 marks. The total weightage of this section shall be 14 marks.
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from UNIT-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 07 marks. The total weightage of this section shall be 14 marks.
Course Objectives:

1.	The main objective of this course is to impart the necessary knowledge to students about securing the sensitive information.
2.	This course provides the knowledge about the concept of Encryption and Network Security and guarantees a secure network by identifying different types of attacks and threats.
3.	This course also creates awareness among learners about the laws associated with the protection of data and information.

UNIT-I

Introduction to Security: Meaning of Security, Attacks, Computer Crime, Methods of Defense
Encryption: Cryptography, Substitution Ciphers, Transpositions, Encryption Algorithms**,** Symmetric Encryption Data Encryption Standards (DES), Advanced Encryption Standards(AES), Public Key Encryption, Hash Functions, Key exchange, Digital Signatures.
Viruses and Malicious Code: Program security, Control against Program Threats
Operating Systems Security: Access Control, File Protection, User Authentication, Security Policies, Models of Security
Database Security: Security requirements, Reliability and Integrity, Protecting sensitive data, multilevel security

UNIT-II

Security in Networks Threats, Attacks, Protocol Flaws, Impersonation, Spoofing, Denial of Service, Networks security control

Security in Networks Firewalls, Intrusion Detection, Secure e–mail

Risk Analysis and Security Planning Security Policies, Physical Security

Legal and Ethical Issues: Protection of data and Information Laws, Employees rights, Software failure, Computer Crime, Privacy and Ethics

Cyber Security : Essential Terminologies: CIA, Risks, Breaches, Threats, Attacks, Exploits. Information Gathering (Social Engineering, Foot Printing & Scanning).Open Source/ Free/ Trial Tools: nmap, zenmap, Port Scanners, Network scanners.

References:

1. The Basics of Information Security: Understanding the Fundamentals of InfoSec in Theory and Practice by Jason Andress Syngress; 1 edition (June 24, 2011)
2. Information Systems Security: Security Management, Metrics, Frameworks And Best Practices by Nina Godbole, Wiley India Pvt Ltd

Course Outcomes (Cos):

On Completing the course, the students will be able to:

CO-1.	To understand the concepts, such as, security, attacks, vulnerability, exploits, and methods of defence.
CO-2.	To acquire required information about different encryption methods that helps to securely transmit the sensitive information over the internet.
CO-3.	To get the knowledge about the needs of operating system and database security along with the techniques ensuring the security of these systems.
CO-4.	To identify and examines advanced network attacks and also identify different methods and techniques helpful in preventing these attacks.
CO-5.	To get an idea of different tools and techniques which are commonly used by hackers to collect the sensitive information.

BACHELOR OF VOCATION (B.VOC.) (SOFTWARE DEVELOPMENT)
SEMESTER–IV
BVSD-243: OPERATING SYSTEM

Time: 3 Hours **Max. Marks: 50**
Credit Hours (per week):4 **Theory Marks: 37**
Total Hours: 60 **Theory Internal Assessment Marks: 13**

Instructions for the Paper Setters:- Medium of Examination is English Language.

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry 1.5 marks with answer to each question up to 10 lines in length. The total weightage being 09 marks.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from UNIT-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 07 marks. The total weightage of this section shall be 14 marks.
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from UNIT-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 07 marks. The total weightage of this section shall be 14 marks.
Course Objectives:

The objectives of the operating system are –

1.	Define and list the functions of an operating system. Explain the list resources involved in process creation and management.
2.	To act as an intermediary between the hardware and its users, making it easier for the users to access and use other resources.
3.	To manage the resources of a computer system.
4.	To keep track of who is using which resource, granting resource requests, and mediating conflicting requests from different programs and users.
5.	To learn different process scheduling algorithms and synchronization techniques to achieve better performance of a computer system.

UNIT-I

Introduction: Definition, Early Systems, Simple Batch system, Multi programmed Batch. Time Sharing Systems, Personal Computer System, Parallel Systems, Distributed Systems, Real–time Systems.
Processes: Process concepts, Process Scheduling, threads.
CPU–Scheduling: Basic concepts, scheduling criteria, scheduling algorithms, algorithm evaluation.

Process Synchronization: Background critical – section problem, semaphores, classical problem of synchronization.

Memory Management: Background, Logical v/s Physical address space, mapping, continuous allocation, paging, segmentation.

Virtual Memory: Background, demand paging, performance of demand paging, page replacement, page replacement algorithms, allocation of frames, thrashing.

UNIT-II

Secondary Storage Structures: Disk structures, Disk scheduling, Disk Reliability.

Deadlocks: System Model, Deadlock characterization, methods for handing deadlocks, Deadlocks Prevention, Deadlock avoidance, Deadlock detection, Recovery from deadlock, combined approach to deadlock handling.

References:

1. "Operating System Concepts", Fourth edition by Silberschatz Galvin Addison Wesley.
2. "Operating Systems: A Design Oriented Approach" by Crowley, Published by Tata McGraw Hill.
3. "Operating Systems" Second edition by Dietel, Addison Wesley.

Course Outcomes:

At the end of this course student will:

CO-1.	Understands the different services provided by Operating System at different level.
CO-2.	Describe the general architecture of computers, also contrast and compare differing structures for operating systems
CO-3.	Learn real life applications of Operating System in every field.
CO-4.	Understands the use of different process scheduling algorithm and synchronization techniques to avoid deadlock.
CO-5.	Learn different memory management techniques like paging, segmentation and demand paging etc.

BACHELOR OF VOCATION (B.VOC.) (SOFTWARE DEVELOPMENT)
SEMESTER–IV

BVSD-244P : LAB I: PRACTICAL BASED ON ANDROID DEVELOPMENT

Time: 3 Hrs. **Max. Marks: 100**
Credit Hours (per week):4 **Practical Marks: 75**
Total Hours: 60 **Internal marks: 25**

Course Objectives:

1.	Encourage beginners for App development and create some awesome android projects.
2.	This will help them learn, practice, and understand Android development right from the basics.
3.	Android has a vast number of users, and the future of android professionals is very bright.
4.	An android development gives all the flexibility and the ability to work from anywhere.

Practical based on Application Development in Android

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Able to write simple GUI applications
CO-2.	Capable to Design and develop user Interfaces for the Android platform.
CO-3.	Able to use different layouts, sound, picture effects.
CO-4.	Able to use the professional, managerial, interdisciplinary skill set, and domain specific tools in development processes.
CO-5.	Ability to handle different codes of different blocks.

BACHELOR OF VOCATION (B.VOC.) (SOFTWARE DEVELOPMENT)
SEMESTER–IV
BVSD-245P : LAB – II: OPEN SOURCE SOFTWARE TOOLS

Time: 3 Hrs. **Max. Marks: 75**
Credit Hours (per week):4 **Practical Marks: 56**
Total Hours: 60 **Internal marks: 19**

Course Objectives:

1.	To expose students to free open source software environment and introduce them to use open source packages.
2.	Demonstrate different open source technology like Python, PHP & Perl with different packages
3.	The practical objective of the course is to teach students how they can begin to participate in a OSS project in order to contribute to and improve aspects of the software that they feel are wrong.
4.	Learn some important OSS tools and techniques for contributing to projects and how to set up their own OSS projects.

Practical based on Open Source Software Tools
Case Study of Open Source Software like PHP, PYTHON, PERL & Mozilla

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Implement various applications using build systems like Python,Perl, PHP etc.
CO-2.	Understand the installation of various packages in open source operating systems.
CO-3.	Understand to build a simple application/software using Pyhton.
CO-4.	Create simple Website applications using PHP Language.
CO-5.	Able to Execute programs related to PERL Language.

BACHELOR OF VOCATION (B.VOC.) (SOFTWARE DEVELOPMENT)
SEMESTER–IV
BVSD-246P: LAB – III: PRACTICAL BASED ON ASP.NET USING C#

Time: 3 Hrs. **Max. Marks: 75**
Credit Hours (per week):4 **Practical Marks:56**
Total Hours: 60 **Internal marks: 19**
Course objectives:

1.	Provide insight into .Net technologies for web development.
2.	Design and develop interactive and responsive web applications using C#
3.	To create website using different ASP.Net controls.

Practical based on ASP.Net using C#

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Gain knowledge about the architecture of .Net platform.
CO-2.	Learn to apply different validation controls in a web page.
CO-3.	Able to create database connectivity.
CO-4.	Gain knowledge to create simple web forms and implement the concept of master page.
CO-5.	Creation of user interactive web pages using combination of client side and server side applications

BACHELOR OF VOCATION (B.VOC.) (SOFTWARE DEVELOPMENT)

Course Code: ESL–222
Course Title: ENVIRONMENTAL STUDIES–II (COMPULSORY)

Credit Hours (Per Week): 2
Total Hours: 30
Maximum Marks: 50 Marks

Instructions for Paper Setters: The question paper will consist of three sections. Candidate will be required to attempt all the sections. Each unit of the syllabus should be given equal weightage of marks. Paper to be set in English, Punjabi and Hindi.
Section–A: (16 Marks): It will consist of five short answer type questions. Candidates will be required to attempt four questions, each question carrying four marks. Answer to any of the questions should not exceed two pages.
Section–B: (24 Marks): It will consist of five questions. Candidates will be required to attempt four questions, each question carrying six marks. Answer to any of the questions should not exceed four pages.
Section–C: (10 Marks): It will consist of two questions. Candidate will be required to attempt one question (carrying ten marks) only. Answer to the question should not exceed 5 pages.

Course Objectives

CO-1	To study the concept of Biodiversity – role, importance, values and its conservation. Hot spots and threats to biodiversity.
CO-2	To create awareness regarding environmental pollution, its causes and effects and preventive measure to control the different types of pollution.
CO-3	To make students aware of growing human population – causes and concern. Family welfare programs. Road safety (Traffic) rules.
CO-4	To know about entrepreneurship development and civil/self defense.

UNIT-I

Biodiversity and its Conservation:

- Definition: Genetic, species and ecosystem diversity.
- Biogeographical classification of India.
- Value of Biodiversity: Consumptive use; productive use, social, ethical, aesthetic and option values.
- Biodiversity of global, National and local levels.
- India as mega-diversity nation.
- Hot-spots of biodiversity.
- Threats to Biodiversity: Habitat loss, poaching of wild life, man wildlife conflicts.
- Endangered and endemic species of India.

- Conservation of Biodiversity: In situ and Ex-situ conservation of biodiversity.

UNIT-II

Environmental Pollution:

- Definition, causes, effects and control measures of:
  a) Air Pollution
  b) Water Pollution
  c) Soil Pollution
  d) Marine Pollution
  e) Noise Pollution
  f) Thermal Pollution
  g) Nuclear Hazards
  h) Electronic Waste
- Solid Waste Management: Causes, effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution.
- Pollution case studies.
- Disaster Management: Floods, Earthquake, Cyclone and Landslides.

UNIT-III

Human Population and the Environment

- Population growth, variation among nations.
- Population explosion-Family welfare programme.
- Environment and human health.
- Human rights.
- Value education.
- HIV/AIDS.
- Women and child welfare.
- Role of information technology in environment and human health.
- Case studies.
- Road Safety Rules & Regulations**:** Use of Safety Devices while Driving, Do's and Don'ts while Driving, Role of Citizens or Public Participation, Responsibilities of Public under Motor Vehicle Act, 1988, General Traffic Signs.
- Accident & First Aid**:** First Aid to Road Accident Victims, Calling Patrolling Police & Ambulance.

UNIT-IV

National Service Scheme:

- **Entrepreneurship Development:** Definition & Meaning; Qualities of good entrepreneur; Steps/ ways in opening an enterprise; Role of financial and support service Institutions.

- **Civil/Self Defense:** Civil defense services, aims and objectives of civil defense; Needs for self-defense training.

Field Visits:

- Visit to a local area to document environmental assets–river/forest/grassland/hill/ mountain.
- Visit to a local polluted site–Urban/Rural/Industrial/Agricultural.
- Study of common plants, insects, birds.
- Study of simple ecosystems–pond, river, hill slopes etc.
- Contribution of the student to NSS/any other social cause for service of society.
- Visit to Museum/Science City

Note: In this section the students will be required to visit and write on the environment of an area/ ecosystem/vi1lage industry/disaster/mine/dam/agriculture field/waste management/hospital etc. with its salient features, limitations, their implications and suggestion for improvement.

References/Books:

11. Agarwal, K. C. 2001. Environmental Biology, Nidhi Publications Ltd. Bikaner.
12. Bharucha, E. 2005. Textbook of Environmental Studies, Universities Press, Hyderabad.
13. Down to Earth, Centre for Science and Environment, New Delhi.
14. Jadhav, H. & Bhosale, V. M. 1995. Environmental Protection and Laws. Himalaya Pub.
15. Joseph, K. and Nagendran, R. 2004. Essentials of Environmental Studies, Pearson Education (Singapore) Pte. Ltd., Delhi.
16. Kaushik, A. & Kaushik, C. P. 2004. Perspective in Environmental Studies, New Age International (P) Ltd, New Delhi.
17. Miller, T. G. Jr. 2000. Environmental Science, Wadsworth Publishing Co.
18. Sharma, P. D. 2005. Ecology and Environment, Rastogi Publications, Meerut.
19. Booklet on Safe Driving. Sukhmani Society (Suvidha Centre), District Court Complex, Amritsar
20. Kanta, S., 2012. Essentials of Environmental Studies, ABS Publications, Jalandhar.

Course Outcomes

CO-1	To know about the meaning of Biodiversity and its role in environment.
CO-2	To know about the causes of different forms of pollution and their control measures.
CO-3	To know about the causes and challenges of growing human population. Women and child welfare programs.
CO-4	To know the development of entrepreneurship and techniques of civil/self defense.

BACHELOR OF VOCATION (B.VOC.)
(SOFTWARE DEVELOPMENT)

Semester – V

Sr. No.	Paper Code	Paper Name	Marks				Page No.
			Theory	Internal Assessment	Practical	Total	
1	BVSD-351	Software Project Management and Business Solution	37	13		50	510-511
2	BVSD-352	Software Re-engineering	37	13		50	512-513
3	BVSD-353	Software Testing & Quality Assurance	37	13		50	514-515
4	BVSD-354P	Lab I: Soft Skills in IT		13	37	50	516
5	BVSD-355P	Lab II: System and Network Administration		25	75	100	517
6	BVSD-356P	Lab III: Software Testing (Case Tools)		25	75	100	518

BACHELOR OF VOCATION (B.VOC.) (SOFTWARE DEVELOPMENT)
SEMESTER–V
BVSD-351: Software Project Management and Business Solution

Time: 3 Hours **Max. Marks: 50**
Credit Hours (per week):60 **Theory Marks: 37**
Total Hours: 60 **Theory Internal Assessment Marks: 13**

Instructions for the Paper Setters:- Medium of Examination is English Language.

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry 1.5 marks with answer to each question up to 10 lines in length. The total weightage being 09 marks.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from UNIT-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 07 marks. The total weightage of this section shall be 14 marks.
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from UNIT-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 07 marks. The total weightage of this section shall be 14 marks.
Course Objectives:

1.	Understand the five distinctive phases of project are Initiation, Planning and Design, Construction and Execution, Monitoring and Control, Completion. These five steps ensure the success of a project.
2.	Understand the various project evaluation techniques such as Cost benefits evaluation techniques and risk evaluation.
3.	Understand the important project constraints are, Scope in that the main goal of the project is completed within the estimated Time, while being of the expected Quality and within the estimated Budget.
4.	Understand the optimization of the allocated necessary inputs and their application to meeting the project's pre-defined objectives.

UNIT-I

Introduction to Software Project Management: Project Definition, Contract Management, Activities covered By Software Project Management, Overview of Project Planning, Stepwise Project Planning.

Project Evaluation: Strategic Assessment, Technical Assessment, Cost Benefit Analysis, Cash Flow Forecasting, Cost Benefit Evaluation Techniques, Risk Evaluation.

Activity Planning Objectives, Project Schedule, Sequencing and Scheduling Activities, NetworkPlanning Models – Forward Pass , Backward Pass , Activity Float , Shortening Project

Duration ,Activity on Arrow Networks , Risk Management , Nature Of Risk , Types Of Risk , ManagingRisk , Hazard Identification , Hazard Analysis , Risk Planning And Control.

UNIT-II

Monitoring and Control Creating Framework ,Collecting The Data , Visualizing Progress , Cost Monitoring , Earned Value , Prioritizing Monitoring , Getting Project Back To Target , Change Control , Managing Contracts , Introduction , Types Of Contract , Stages In Contract Placement , Typical Terms Of A Contract , Contract Management , Acceptance.

Managing People and Organizing Teams Introduction,Understanding Behavior, Organizational Behaviour: A Background, Selecting The Right Person For The Job, Instruction In The Best Methods, Motivation, The Oldham, Hackman Job Characteristics Model, Working In Groups, Becoming A Team, Decision Making, Leadership, Organizational Structures , Stress, Health And Safety, Case Studies.

Business Solutions Information system in Global Business: How Businesses use Information system, ethical and Social Issues in IS, DSS: Enhancing Decision making, Business Intelligence tools, E-commerce: types, web-based business, ERP, EDI

References:

1. Bob Hughes, Mike Cotterell, “Software Project Management”, Third Edition, Tata McGraw Hill, 2004.
2. Ramesh, Gopalaswamy, "Managing Global Projects", Tata McGraw Hill, 2001.
3. Royce, “Software Project Management”, Pearson Education, 1999.
4. Jalote, “Software Project Management in Practice”, Pearson Education, 2002.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Develop a plane, which is cost effective, and ensure the success of a project.
CO-2.	Identify the types of risk that will possible to come in project.
CO-3.	Estimate and cost the human and physical resources required, and make plans to obtain the necessary resources.
CO-4.	Break work down into tasks and allocate roles with clear lines of responsibility and accountability.

BACHELOR OF VOCATION (B.VOC.) (SOFTWARE DEVELOPMENT)
SEMESTER–V
BVSD-352: Software Re-engineering

Time: 3 Hours **Max. Marks: 50**
Credit Hours (per week):4 **Theory Marks: 37**
Total Hours: 60 **Theory Internal Assessment Marks: 13**

Instructions for the Paper Setters:- Medium of Examination is English Language.

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry 1.5 marks with answer to each question up to 10 lines in length. The total weightage being 09 marks.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from UNIT-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 07 marks. The total weightage of this section shall be 14 marks.
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from UNIT-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 07 marks. The total weightage of this section shall be 14 marks.

Course Objectives:

The main motive of reengineering is to ameliorate the maintainability of software. Therefore, this course emphasizes on the elaboration of the principles, techniques, and tools mostly helpful in re-engineering the software.

UNIT-I

Introduction to Software Re-engineering: Software Reengineering and its importance, goals ofreengineering, Software reengineering process model, software reengineering tools and Businessprocess reengineering: Business processes, A BPR Model.

Legacy Software Structure: Legacy software structure and distribution: Layered distribution model, Legacy software distribution, Architectural problems.

Reverse Engineering: Need of reverse engineering, Reverse engineering process, Reverse engineering to understand data, Reverse engineering user interfaces, Tools for reverse engineering.

Restructuring: Code restructuring: Characteristics of unstructured code, Characteristics of structured code, restructuring problems, Data restructuring (Data reengineering): Data reengineering process, Data problems, Approaches: Data cleanup, Data extension, Data migration, Need for Data migration, data migration process, Tools for restructuring.

UNIT-II

Refactoring: Introduction to refactoring, Principles of refactoring, Need for refactoring, Problems with refactoring, Refactoring and design, Refactoring and performance. Different refactoring techniques and their use, refactoring tools.

Forward Engineering: Introduction to forward engineering, Goals of forward engineering, Forward engineering for client/server applications, Tools for forward engineering, forward engineering v/s reverse engineering

Software Reuse: Software Reuse Success Factors, Reuse Driven Software Engineering in a Business, Use case Components, Object Components, Layered Architecture.

References:

1. Software Engineering, Ian Sommerville, Addison-Wesley, 6th Edition.
2. Software Engineering, A Practitioner's Approach, Roger S. Pressman, 6th Edition.
3. Software Reuse: Architecture, Process and Organization for Business Success, Ivar Jacobson, Martin Griss, Patrik Jonsson, Pearson Education, 2000

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	To identify the different software reengineering models and tools.
CO-2.	To understand the importance of reengineering in case of legacy systems.
CO-3.	To understand the importance of Reverse Engineering methods and the utilization of these methods in understanding data and user interfaces.
CO-4.	To explain the activities involved in software re-engineering, such as, restructuring, refactoring, and Forward engineering.
CO-5.	Understand the concepts and theory related to Software Reuse.

BACHELOR OF VOCATION (B.VOC.) (SOFTWARE DEVELOPMENT)
SEMESTER–V

BVSD-353: Software Testing & Quality Assurance

Time: 3 Hours **Max. Marks: 50**
Credit Hours (per week):4 **Theory Marks: 37**
Total Hours: 60 **Theory Internal Assessment Marks: 13**

Instructions for the Paper Setters:- Medium of Examination is English Language.

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry 1.5 marks with answer to each question up to 10 lines in length. The total weightage being 09 marks.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from UNIT-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 07 marks. The total weightage of this section shall be 14 marks.

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from UNIT-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 07 marks. The total weightage of this section shall be 14 marks.

Course Objective:

1.	To learn metrics for managing quality assurance and understand capabilities of test tools.
2.	To explore the effective testing techniques (both black-box and white box) for ensuring high quality software.
3.	To learn how to planning a test project, design test cases and data, conduct testing operations, manage software problems and defects, generate a testing report.

UNIT-I

Introduction: Overview of Software Engineering, Software Process, Process Models, Overview of Project Management Process and its Phases.

Software Quality Assurance Concepts and Standards: Quality Concepts, Quality Control, Quality Assurance, SQA Activities, Software Reviews, Formal Technical Reviews, Review Guidelines, Software Reliability, Software Safety, Quality Assurance Standards, ISO 9000, ISO 9001:2000, ISO 9126 Quality Factors, CMM, TQM, Six Sigma, SPICE, Software Quality Assurance Metrics.

Software Testing and Techniques: Introduction and Testing Types, Verification and Validation, Test Strategies for Conventional and Object Oriented Software, Metrics for Testing, Debugging Process, Debugging Strategies, Different Testing Techniques: Black Box and White Box Testing, Basis Path Testing, Graph Matrices, Graph Based Testing Methods.

UNIT-II

Object Oriented Testing Methods: Applicability of Conventional Test Case Design Methods, Issues in Object Oriented Testing, Fault-Based Testing, Scenario-Based Testing, Random Testing and Partition Testing for Classes, Interclass Test Case Design.

Testing Process and Specialized Systems Testing: Test Plan Development, Requirement Phase, Design Phase and Program Phase Testing, Testing Client/Server Systems, Testing Web based Systems, Testing Off the-Shelf Software, Testing in Multiplatform Environment, Testing

for Real Time Systems, Testing Security.

References:

1.Ian Sommerville, Software Engineering, Seventh Edition, Pearson Education.
2.R.S. Pressman, Software Engineering: A Practitioner's Approach, Sixth Edition, Tata McGraw-Hill.
3.William E. Perry, Effective Methods for Software Testing, Second Edition, John Wiley & Sons. 4.Paul C.Jorgensen, Software Testing:A Craftsman's Approach, Third Edition, Auerbach Publications, Taylor and Francis Group, 2010.
5. Yogesh Singh, Software Testing, Cambridge University Press.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Apply software testing knowledge and engineering methods.
CO-2.	Understand and identify various software testing problems, and solve these problems by designing and selecting software test models, criteria, strategies, and methods.
CO-3.	Analyze and understand the use of software testing methods and modern software testing tools for their testing projects.
CO-4.	Learn to design SQA activities, SQA strategy, formal technical review report for software quality control and assurance.
CO-5.	Follow the process related activity and testing techniques to work as team members.

BACHELOR OF VOCATION (B.VOC.) (SOFTWARE DEVELOPMENT)

SEMESTER–V

BVSD-354P: Lab I: Soft Skills in IT

Credit Hours (per week):60 **Max. Marks: 50**

Total Hours: 60 **Practical Marks: 37**

Practical Internal Assessment Marks: 13

Course Objectives:

At the end of the course, the students will be able to:
1. Develop effective communication skills (spoken and written).
2. Develop effective presentation skills.
3. Become self-confident individuals by mastering inter-personal skills, team management skills, and leadership skills.
4. Develop all-round personalities with a mature outlook to function effectively in different circumstances.
5. Develop broad career plans, evaluate the employment market, identify the organizations to get good placement, match the job requirements and skill sets.

Verbal Communication: Public speaking, group discussion, presentation skills, interview skills,listening and observation skills.

Written communication: project proposals, Technical reports, grammar and vocabulary for effective technical writing, Technical resume

Personality Development: Personal grooming, Dressing for interviews, dressing for office, leadership, group dynamics and team building, conflict management, Critical Thinking, Reflective Thinking and Decision making, problem Solving Skills and Time management

Technical etiquettes: Etiquettes in office as well as social settings, email etiquettes, telephone etiquettes.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Effectively communicate through verbal/oral communication and improve the listening skills.
CO-2.	Demonstrating clear briefing and listening skills, not being afraid to ask for help and support when necessary.
CO-3.	Write precise briefs or reports and technical documents.
CO-4.	Actively participate in group discussion / meetings / interviews and prepare & deliver presentations.
CO-5.	Become more effective in team building, conflict management, Critical Thinking, Reflective Thinking and Decision-making, problem Solving Skills and Time management.

BACHELOR OF VOCATION (B.VOC.) (SOFTWARE DEVELOPMENT)

SEMESTER–V

BVSD-355P: Lab II: System and Network Administration

Credit Hours (per week):60 **Max. Marks: 100**
Total Hours: 60 **Practical Marks: 75**
Practical Internal Assessment Marks: 25

Course Objectives:

1	The main objective of this course is to explore the existing operating systems and their administration and maintenance within the network setting.
2	This course will assist the learner to install, maintain, and extend multi-user computer systems.
3	Also, this course helps the learner to understand how to apply troubleshooting to resolve the problem.

Lab based on System and Network Administration

Course Outcomes (COs):

On Completing the course, the students will be able to:

CO-1.	To execute and evaluate network administration commands and demonstrate their use.
CO-2.	To install the network cable.
CO-3.	To perform the system maintenance.
CO-4.	To evaluate and implement security solutions.
CO-5.	To upgrade the hardware and software of system.

BACHELOR OF VOCATION (B.VOC.) (SOFTWARE DEVELOPMENT)
SEMESTER–V

BVSD 356P : Lab III: Software Testing (Case Tools)

Credit Hours(per week): 4
Total Hours: 60 **Max. Marks: 100**
Practical Marks: 75
Practical Internal Assessment Marks: 25

Course Objectives:

1.	The main objective of this practical lab is to impart knowledge on the commonly used CASE tools helpful in testing process.
2.	This course will provide a scope to hands-on on different small and real-life problems

Practical Based on Software Testing (Case Tools)

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Deploy the advanced technologies in software testing
CO-2.	Get hands-on practice on the CASE tools for testing purposes.
CO-3.	This course will help the students to enhance skills in software test automation and management.
CO-4.	Describe and compute the mutation score.
CO-5.	This course will help the students to calculate the coverage analysis of programs.

BACHELOR OF VOCATION (B.VOC.) (SOFTWARE DEVELOPMENT)

Semester – VI

Sr. No.	Paper Code	Paper Name	Marks				Page No.
			Theory	Internal Assessment	Practical	Total	
1	BVSD-361	Software Project Management and Business Solution	-	100	300	400	520

BACHELOR OF VOCATION (B.VOC.) (SOFTWARE DEVELOPMENT)
SEMESTER–VI
BVSD-361: - Project Dissertation

Credit Hours (per week):4 **Max. Marks:400**
Total Hours: 60 **Project Marks: 300**
Practical Internal Assessment Marks: 100

Course Objectives:

At the end of the course, the students will be able to:

1.	Test their interest in a particular career before permanent commitments are made.
2.	Provide comprehensive learning platform to students where they can enhance their employ ability skills and become job ready along with real corporate exposure.
3.	Enhance students' knowledge in one particular technology.
4.	Increase self-confidence of students and helps in finding their own proficiency
5.	Build the strength, teamwork spirit and self-confidence in their life.
6.	To provide learners hands on practice within a real job situation.

General Instructions:

Report based on Industrial Training and project shall be submitted to the College/Institute till April 30.

The evaluation of the work shall be done by the following panel of examiners prior to the theory examination:

(a). Internal Examiner
(b). Head/ Head Nominee of coordinating department of the college for this UGC scheme
(c). External Examiner (to be appointed by the University)

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Become master in one's specialized technology.
CO-2.	Become a multi-skilled person with good technical knowledge, management, leadership and entrepreneurship skills.
CO-3.	Communicate efficiently.
CO-4.	Identify, formulate and model problems and find different solutions for these problems.
CO-5.	Update with all the latest changes in technological world.

P

SYLLABUS FOR THE BATCH FROM THE YEAR 2022 TO YEAR 2023

Programme Code: DCA

Programme Name: Diploma in Computer Applications

(Semester I-II)

Examinations: 2022-2023

P.G. Department of Computer Science & Applications

Khalsa College, Amritsar

DIPLOMA COURSE IN COMPUTER APPLICATIONS

Programme name: Diploma in Computer Applications
Programme code: DCA
Programme Duration :1 year

Programme Objectives:

1.	Diploma program is aimed at towards building a prospective career in the field of computer application.
2.	The program is designed with the objective to provide knowledge and skills in the various aspects of computer applications.
3.	Students will also be trained in the latest trends of information technology.

Programme Specific Outcomes (PSOs):

PSO-1.	Theoretical and practical knowledge of MS Word, MS PowerPoint, MS Excel and MS Access.
PSO-2.	Usage of DBMS design and administration.
PSO-3.	Practical Skills Using SQL and PL/SQL.
PSO-4.	Gather data to analyze and specify the requirements of a system.
PSO-5.	Understanding the basic components of computers and terminology.

DIPLOMA COURSE IN COMPUTER APPLICATIONS
Semester – I

Sr. No.	Paper	Paper Name	Marks				Page No.
			Theory	Practical	Internal	Total	
1	DCA-111	Information Technology and Operating System	37	37	13 Th. 13 Prac.	100	524-525
2	DCA-112	PC Computing-I	37	37	13 Th. 13 Prac.	100	526-528

DIPLOMA COURSE IN COMPUTER APPLICATIONS

(SEMESTER – I)
DCA-111: Information Technology and Operating System

Time: 3 Hours **Max. Marks: 100**
Credit Hours (per week): 4 **Theory Marks: 37**
Total Hours: 60 **Theory Internal Assessment Marks: 13**
Practical Marks: 37
Practical Internal Assessment Marks: 13

Note: 1 The question paper covering the entire course shall be divided into three sections
2 Medium of Examination is English Language.

Instructions for Paper Setters:

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **1.5 marks** with answer to each question up to 10 lines in length. The total weightage being **09 marks**.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **07 marks.** The total weightage of this section shall be **14 marks.**

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **07 marks.** The total weightage of this section shall be **14 marks**.

Course Objectives:

1.	Take on leadership positions and/or embark on a research career in the field.
2.	Collaborate in diverse team environments to make positive contributions in the IT field.
3.	Work effectively in the IT field to make a positive contribution to society.

UNIT–I

Information Concepts and Processing Evolution of Information Processing Data Information Language Communication and Network Client Server Systems Computer Networks LAN & WAN

Internet
Understanding the Internet E–mail Basics
Browsing the Web
Finding Stuff on the Web and Net

Elements of a Computer Processing System
Hardware – CPU
Storage Devices and Media VDU
Input – Output
Data Communication Equipment Software–System Software, Application Software

UNIT–II

Programming Languages Classification Machine Code Assembly LanguageHigher Level Languages Fourth Generation languages

Operating System

What is Operating System–Evolution of OS Types of Operating System

A) Single User Systems

B) Multi User Systems : Unix, XENIX, VAX/VMS

Booting a System

References:

V.K. Jain : Fundamentals of Information Technology

Course Outcomes (COs):

On Completing the course, the students will be able to:

CO-1.	Understanding the progress of information and communication technologies (ICT) and their role in modern World:
CO-2.	Using the computer and/or similar electronic devices suitably for data processing.
CO-3.	Exploring different kinds of software.
CO-4.	Managing information in a computer and/or similar electronic devices in the classroom.
CO-5.	How to use different types of Operating systems.

DIPLOMA COURSE IN COMPUTER APPLICATIONS (SEMESTER – I)
DCA-112: PC Computing–I

Time: 3 Hours
Credit Hours (per week):4
Total Hours: 60

Max. Marks: 100
Theory Marks: 37
Theory Internal Assessment Marks: 13
Practical Marks: 37
Practical Internal Assessment Marks: 13

Note: 1 The question paper covering the entire course shall be divided into three sections
2 Medium of Examination is English Language.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **1.5 marks** with answer to each question up to 10 lines in length. The total weightage being **09 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **07 marks.** The total weightage of this section shall be **14 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **07 marks.** The total weightage of this section shall be **14 marks**.

Course Objectives:

1.	To be proficient in office automation applications.
2.	Handle the word processing software.
3.	To create presentation using MS PowerPoint.
4.	Understand that in today's commercial world, automation helps the users with a sophisticated set of commands to format, edit, and print text documents.
5.	Use it as valuable and important tools in the creation of applications such as newsletters,brochures, charts, presentation, documents, drawings and graphic images.

UNIT–I

Introduction to windows

1.1 Origin of windows

a) Parts of Windows Screen (Definition)
- The Desktop, the taskbar
- Start Menu
- The windows
- Icons

b) Types of windows
- Application Windows
- Document Windows

c) Anatomy of a window

- The title bar
- Minimize and Maximize buttons
- The control box
- Scroll bars, scroll buttons and scroll boxes
- About my computer icon
- About the networking neighbourhood icon
- Recycle bin
- Folders – creation and definition
- Windows explorer (definition)
- Shortcut icons with creation and definition.

Introduction to MS–Office

Introduction to Word (Word for Windows)

1. Introduction to Word
2. Introduction to Parts of a Word Window (Title bar, Menu bar, Tool bar, the Ruler, Status area)
3. Creating new document
4. Opening an existing document
5. To insert a second document into an open document
6. Editing a document
7. Deleting text, replacing text, moving and copying text
8. Page setup
9. Margins and gutters
10. Changing fonts and front size
11. To make text bold, italic or underline
12. Line spacing
13. Centering, right alignment and left alignment
14. Page breaks
15. Headers and footers
16. Putting page numbers in headers and footers
17. Saving documents
    - naming word document
    - saving in different formats
    - saving on different disks
18. Spell checker
19. Printing
20. Creating a table using the table menu
    - entering and editing text in tables
    - selecting in tables
    - adding rows
    - changing row heights
    - deleting rows
    - inserting columns
    - changing columns and cell width
21. Borders and shading
22. Templates and wizards
23. Working the graphics
24. Drawing objects

25. Using frames, position objects
26. Mail merge
27. Using word and word documents with other applications

UNIT–II

MS–POWER POINT

1. Introduction to MS Power Point
2. Power Point Elements
   - Templates
   - Wizards
   - Views
   - Color Schemes
3. Exploring Power Point Menu
   - Opening and Closing Menus
   - Working with Dialog Boxes
4. Adding text, adding title, moving text area, resizing text boxes, adding art.
5. Starting a new slide
6. Starting a Slide show
7. Saving Presentation
8. Printing Slides
9. Views:
   Slide View, Slide sorter view, notes view, outline view
10. Formatting and enhancing text formatting
    a) Formatting
    - Changing format with a new layout
    - Using a pick look wizards to change format
    - Alignment of Text
    - Working with text spacing

    b) Enhancing
    - Using Bullets
    - Changing text font and size
    - Selecting text style, effect and color
    - Picking up and applying styles
11. Creating Graphs
12. Displaying slide show and adding multi–media

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Use word processors and presentation software.
CO-2.	Understand and create a presentation using MS PowerPoint.
CO-3.	Describe the features and functions of the categories of application software.
CO-4.	Understand the dynamics of an office environment.
CO-5.	Demonstrate the ability to apply application software in an office environment.

DIPLOMA COURSE IN COMPUTER APPLICATIONS

Semester – II

Sr. No.	Paper	Paper Name	Marks				Page No.
			Theory	Practical	Internal	Total	
1	DCA-121	Database Management System	37	37	13 Th. 13 Prac.	100	530-531
2	DCA-122	PC Computing–II	37	37	13 Th. 13 Prac.	100	532-533

DIPLOMA COURSE IN COMPUTER APPLICATIONS (SEMESTER – II)
DCA-121: Database Management Systems

Time: 3 Hours **Max. Marks: 100**
Credit Hours (per week):4 **Theory Marks: 37**
Total Hours:60 **Theory Internal Assessment Marks: 13**
Practical Marks: 37
Practical Internal Assessment Marks: 13

Note: 1 The question paper covering the entire course shall be divided into three sections
2 Medium of Examination is English Language.

Instructions for Paper Setters:

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **1.5 marks** with answer to each question up to 10 lines in length. The total weightage being **09 marks**.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **07 marks.** The total weightage of this section shall be **14 marks.**

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **07 marks.** The total weightage of this section shall be **14 marks**.

Course Objectives:

1. To provide a sound introduction to the discipline of database management as a subject in its own right, rather than as a compendium of techniques and product-specific tools.
2. To familiarize the participant with the nuances of database environment towards an information-oriented data-processing oriented framework.

UNIT–I

Introduction to Database Management System, Components of DBMS, E.R. Diagrams, Data Models, Hierarchical Model, Network Model and Relational Model.

Concept of Database Security, Protection, Integrity, Recovery, Concurrency. Idea of Distributed Databases, Knowledge Base/Expert Systems

ORACLE 10g: SQI.

***PLUS**

Introduction to Oracle **10g**

SQL– DQL, DML, DCL

Join methods & Sub query, Union, Intersection, Minus, Tree Walking

Built in Functions, Views, Security amongst users, Sequences, Indexing Object Oriented Features of Oracle 10g

Unit – II

PL/SQL

Introduction to PL/SQL
Cursors– Implicit & Explicit
Procedures, Functions & Packages
Database Triggers

References:

C.J. Date: Data Base Management Systems

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Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Describe the fundamental elements of relational database management systems.
CO-2.	Explain the basic concepts of relational data model, entity-relationship model, relational database design, relational algebra and SQL.
CO-3.	Design ER-models to represent simple database application scenarios.
CO-4.	Convert the ER-model to relational tables, populate relational database and formulate SQL queries on data.
CO-5.	Improve the database design by normalization

DIPLOMA COURSE IN COMPUTER APPLICATIONS
(SEMESTER – II)
DCA-122: PC Computing–II

Time: 3 Hour **Max. Marks: 100**
Credit Hours (per week):4 **Theory Marks: 37**
Total Hours:60 **Theory Internal Assessment Marks: 13**
Practical Marks: 37
Practical Internal Assessment Marks: 13

Note: 1 The question paper covering the entire course shall be divided into three sections
2 Medium of Examination is English Language.

Instructions for Paper Setters:

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **1.5 marks** with answer to each question up to 10 lines in length. The total weightage being **09 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **07 marks.**The total weightage of this section shall be **14 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **07 marks.**The total weightage of this section shall be **14 marks**.

Course Objectives:

1.	To be proficient in using the MS Excel and MS Access applications.
2.	To perform the calculations using the Excel worksheet.
3.	To create a database using MS Access.
4.	Operate a variety of advanced spreadsheet and database functions.

UNIT–I

MS–EXCEL

a) Introduction to Worksheet/Spreadsheets
b) Creating a simple Worksheet
c) Computations in a Worksheet

MS–EXCEL

a) Printing the Worksheet
b) Graphs
c) What if Analysis (Data Sort, Fill, Query, Filter)

UNIT–III

MS Access

Introduction, Understanding Databases, Creating Tables, Queries, Forms Reports, Adding graphs to your report.

References:

1.PC Computing by R.K. Taxali.
2.PC Software by Rachpal Singh & Gurinder Singh.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Use spreadsheets and database software.
CO-2.	Creating a worksheet/spreadsheet and applying various formulas on it.
CO-3.	Applying various operations like data sorting, auto-fill, filtering the data of the worksheet.
CO-4.	Creating graphs or charts in Excel and comparing the data.
CO-5.	Understand and create a database using MS Access.
CO-6.	Applying queries and creating forms, reports and adding graphs to your reports in MS Access.

SYLLABUS FOR THE BATCH FROM THE YEAR 2022 TO YEAR 2023

Programme Code: DCS

Programme Name: DIPLOMA IN CYBER SECURITY

(Semester I-II)

Examinations: 2022-2023

P.G. Department of Computer Science & Applications

Khalsa College, Amritsar

Programme name: DIPLOMA IN CYBER SECURITY
Programme code: DCS
Programme Duration 1 years

Programme Objectives

1.	To prepare students with the technical knowledge and skills needed to protect and defend computer systems and networks.
2.	To develop graduates that can plan, implement, and monitor cyber security mechanisms to help ensure the protection of information technology assets.
3.	To develop graduates that can identify, analyze, and remediate computer security breaches.

Program Specific Outcomes (PSOs)

PSO-1.	Assess cyber-security risk management policies in order to adequately protect an organization's critical information and assets.
PSO-2.	Use several different operating systems for the development and implementation of programs in business and technical environments.
PSO-3.	Measure the performance of security systems within an enterprise-level information system. Troubleshoot, maintain and update an enterprise-level information security system.
PSO-4.	Implement cyber security solutions. Be able to use cybersecurity, information assurance, and cyber/computer forensics software/tools. Design operational and strategic cyber-security strategies and policies.

DIPLOMA IN CYBER SECURITY

Semester – I

Sr. No.	Paper	Paper Name	Marks				Page No
			Theory	Practical	Internal	Total	
1	DCS-111	Fundamentals of Cyber Security	75	-	25	100	537-538
2	DCS-112	Cyber Security Techniques & Tools	75	-	25	100	539-540
3	DCS-113	Programming Using Python	75	-	25	100	541-542
4	DCS-114P	Lab I: - Cyber Security Techniques & Tools	-	75	25	100	543
5	DCS-115P	Lab II: - Programming Using Python	-	75	25	100	544

DIPLOMA IN CYBER SECURITY
SEMESTER-I
DCS-111: Fundamentals of Cyber Security

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (per week):4 **Theory Marks: 75**
Total Hours: 60 **Theory Internal Assessment M: 25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

Course Objectives:
The course is designed in a way that a candidate can

1. Identify security breaches
2. Analyse security breaches
3. Remediate computer security breaches
4. Learn and implement the real-world scenarios in Cyber Investigations.

UNIT-I

Introduction to Cyber Space: History of Internet, Cyber Crime, Information Security, Computer Ethics and Security Policies, Choosing the Best Browser according to the requirement and email security, Guidelines to choose web browsers, Securing web browser, Antivirus, Email.
Guidelines for secure password and wi-fi security: Guidelines for setting up a Secure password, Two-steps Password management, Wi-Fi Security. Guidelines for social media and basic Windows security: Guidelines for social media.
Smartphone security guidelines: Introduction to mobile phones, Smartphone Security, Android Security, IOS Security. Cyber Security Initiatives in India: Counter Cyber Security Initiatives in India, Cyber Security Exercise, Cyber Security Incident Handling

UNIT-II

Online Banking, Credit Card and UPI Security: Overview of Online Banking Security, Mobile Banking Security, Security of Debit and Credit Card, UPI Security.

Cyber Security Threat Landscape and Techniques: Cyber Security Threat Landscape, Emerging Cyber Security threats, Cyber Security Techniques, Firewall. IT Security Act and Misc. Topics: IT Act, Hackers-Attacker Countermeasures, Web Application Security, Digital Infrastructure Security, Defensive Programming.

References:

1. Introduction to Cyber Security by Jatindra Pandey.
2. Fundamentals of Network Security 1st Edition by Eric Maiwald.
3. Cyber security by Amit Garg, Dr. Krishan Kumar Goyal.

Course Outcomes:
On Completing the course, the students will be able to:

C0-1	Analyse and evaluate the cyber security needs of an organization.
C0-2	Determine and analyse software vulnerabilities and security solutions to reduce the risk of exploitation
C0-3	Measure the performance and troubleshoot cyber security systems.
C0-4	Implement cyber security solutions and use of cyber security, information assurance, and cyber/computer forensics software/tools.
C0-5	Comprehend and execute risk management processes, risk treatment methods, and key Risk and performance indicators
C0-6	Design and develop security architecture for an organization.
C0-7	Design operational and strategic cyber security strategies and policies

DIPLOMA IN CYBER SECURITY

SEMESTER-I

DCS-112: Cyber Security Techniques & Tools

Time: 3 Hrs. **Total Marks: 100**

Credit Hours (per week):4 **Theory Marks: 75**

Total Hours: 60 **Theory Internal Assessment M: 25**

Note: 1. Medium of Examination is English Language.

2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**

Course Objective:

The objective of this course is

1. The use of security tools
2. The application of security tools
3. The use of security techniques
4. The application of security techniques on real life scenarios such as cyber security consultancy and forensics.
5. In addition to this, students will be able to improve their technical skill-sets and enhance their learning experiences through the use of various cyber tools

UNIT-I

Cyber Security Essentials: Attack Vectors, Threat, Risk and Vulnerability Advanced Persistent Threat and Cyber Kill Chain, Cyber Security Framework. Firewall and Packet Filters, Introduction to Windows and Linux Firewall. Attacks on Wireless Networks, Scanning for Web Vulnerability Tools and HTTP Utilities.

Application Inspection tools: Password Cracking and Brute-Force Tools Web Attack, Information Security Basics to Policy Intrusion Detections System, IT Assets and wireless Security Cyber Security Assurance Framework, desktop Security and Malware E-Commerce and Web-Application Security, social Engineering Internet Crime and Act, Intellectual Property in the Cyber world.

Cryptography and Encryption: Introduction, what is Cryptography? Genesis and Application of Cryptography, Role of Cryptography in Information Security, Digital Signature – A Method for Information Security, Cryptographic Algorithms

UNIT-II

Intrusion Detection for Securing the Networks: Introduction, Network Attacks – The Stages, Need for Intrusion Monitoring and Detection, Intrusion Detection for Information Systems Security

Firewalls for Network Protection: Introduction, what are Firewalls? Demilitarized Zone (DMZ), Why Firewalls are Needed – Protection Provided by Firewalls, Proxy Servers, Topologies for Different Types of Firewalls, Examining Firewalls in the Context of Intrusion Detection Systems, Firewalls vis-à-vis Routers, Design and Implementation Issues in Firewalls, Policies for Firewalls – The Importance of Using Firewalls Effectively, Vendors of Firewall Products

References:

1. Cyber Security – Understanding Cyber Crimes, Computer Forensics and Legal Perspectives Author: Nina Godbole, Sunit Belapure, Publisher: Wiley.
2. India Information Systems Security – Security Management, Metrics, Frameworks and Best Practices Author: Nina Godbole, Publisher: Wiley India.

Course Outcomes:

On Completing the course, the students will be able to:

C0-1	Understand how important security principles must be adhered to when securing the infrastructures
C0-2	Understand the importance of balancing security, operational effectiveness and cost
C0-3	Analyze and to aptly secure the cyber perimeter of the infrastructures against cyber attacks

DIPLOMA IN CYBER SECURITY
SEMESTER-I
DCS-113: Programming Using Python

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (per week):4 **Theory Marks: 75**
Total Hours: 60 **Theory Internal Assessment M: 25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**

Course Objectives:

1.	Demonstrate the ability to solve problems using system approaches, critical and innovative thinking, and technology to create solutions.
2.	Understand the purpose and technology to create solutions.
3.	Create scripts in Python.
4.	Design and develop applications using Python.

Unit I

Python Introduction: Installing and setting Python environment, basics of Python interpreter, Execution of python program, variable, data types, and operators.
Flow control: if, if-else, for, while, range function, continue, pass, break, Strings.
Lists, Tuples and Dictionaries: Basic Operations, Iteration, Indexing, Slicing and Matrixes; Dictionaries: Basic dictionary operations.
Functions: Fundamental Concepts, Parameters & Arguments.

Unit II

Files: Opening Files, Using Text Files.
Standard Modules: Modules (user defined and built-in), OS and SYS, The dir () Function, Packages.

Networking: Socket module, Port Scanning, Packet Sniffing, Traffic Analysis, TCP Packet Injection, Log analysis. HTTP Communications with Python built in Libraries, Web communications with the Requests module.

Forensic Investigations with Python: geo-locating, recovering deleted items, examining metadata and windows registry.

References:

1 . Lutz Mark, (2009). Learning Python, Latest Edition., O'REILLY Media, Inc.

2. TJ. O'Connor, Violent Python A Cookbook for Hackers, Forensic Analysts, Penetration Testers and Security Engineers(2013), Elsevier.

3. Seitz Justin , (2009). Gray Hat Python: Python Programming with Hackers and Reverse Engineers, Latest Edition, No Starch Press, Inc.

4. Seitz Justin , (2015). Black Hat Python: Python Programming for Hackers and Pentesters, Latest Edition, No Starch Press, Inc

5. Berry Paul, (2011). Head First Python. Latest Edition, O'REILLY Media, Inc.

6. Introduction to Computer Science Using Python: A Computational Problem-Solving Focus, Charles Dierbach, Wiley Publications, 2012, ISBN : 978-0-470-91204-1

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Describe the core syntax and semantics of Python programming language.
CO-2.	Discover the need for working with the strings and functions.
CO-3.	Illustrate the process of structuring the data using lists and dictionaries.
CO-4.	Infer the Object-oriented Programming concepts in Python.
CO-5.	To develop the ability to write database applications in Python.

DIPLOMA IN CYBER SECURITY
SEMESTER-I
DCS-114P
Lab I- Cyber Security Techniques & Tools

Credit Hours (per week):4 **Total Marks: 100**
Total Hours: 60 **Practical Marks: 75**
Practical Internal Assessment M: 25

Course Objective:

1.	The lab implementation of security tools
2.	The lab implementation of security techniques
3.	The lab implementation of applying of security techniques on real life scenarios such as cyber security consultancy and forensics with software's.
4.	In addition to this, students will be able to enhance their learning experiences through the use of various cyber tools software's.

Practical Implementation based on Cyber Security Techniques & Tools

Course Outcomes:
After completion of this course, students will be able to:

C0-1	Implement and understand how important security principles must be adhered to when securing the infrastructures.
C0-2	Implement in such a way that a balance of security, operational effectiveness and cost is done.
C0-3	Use Analysis tools against cyber attacks

DIPLOMA IN CYBER SECURITY
SEMESTER-I
DCS-115P
Lab II- Programming Using Python

Credit Hours (per week):4

Total Marks: 100
Practical Marks: 75
Practical Internal Assessment M: 25

Course Objectives:

Enable the student to

1.	Understand the basics of python programming concepts.
2.	Develop programs using object-oriented features, graphical user interfaces and image processing
3.	Understand the high-performance programs designed to build up the real proficiency.

Practical Implementation based on Programming Using Python

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Describe the Control statement, String, List, and Dictionaries in Python.
CO-2.	Understand the different types of function and File handling operations.
CO-3.	Interpret Object oriented programming in Python
CO-4.	Build the interactive python application using GUI.
CO-5.	Develop a multithreading and network application.

DIPLOMA IN CYBER SECURITY
SEMESTER-II

Sr. No.	Paper	Paper Name	Marks				Page No.
			Theory	Practical	Internal	Total	
1	**DCS-121**	Security & Cryptography	**75**	**-**	**25**	**100**	**546-547**
2	**DCS-122**	Ethical Hacking	**75**	**-**	**25**	**100**	**548-549**
3	**DCS-123**	Computer Hacking & Forensics	**75**	**-**	**25**	**100**	**550-551**
4	**DCS-124P**	Lab I - Security & Cryptography	**-**	**75**	**25**	**100**	**552**
5	**DCS-125P**	Lab II- Computer Hacking & Forensics	**-**	**75**	**25**	**100**	**553**

DIPLOMA IN CYBER SECURITY
SEMESTER-II
DCS-121: Security & Cryptography

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (per week):4 **Theory Marks: 75**
Total Hours: 60 **Theory Internal Assessment M: 25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Course Objectives:

Enable the student to

1.	To understand basics of Cryptography and Network Security.
2.	To be able to secure a message over insecure channel by various means
3.	To learn about how to maintain the Confidentiality, Integrity and Availability of a data.
4.	To understand various protocols for network security to protect against the threats in the networks.

UNIT I

Introduction to Cryptography and Block Ciphers: Introduction to security attacks, introduction to cryptography, cryptanalysis – steganography - stream and block ciphers, data encryption standard(DES) , triple DES – AES.
Confidentiality and Modular Arithmetic: Confidentiality using conventional encryption - traffic confidentiality - key distribution - random number generation.

UNIT II

Public key cryptography and Authentication requirements: Principles of public key crypto systems - RSA algorithm - security of RSA - key management – Diffle-Hellman key exchange algorithm - introductory idea of Elliptic curve cryptography.

Integrity checks and Authentication algorithms: MD5 message digest algorithm - Secure hash algorithm (SHA) Digital Signatures: Digital Signatures - authentication protocols - digital signature standards (DSS) - proof of digital signature algorithm - Authentication Applications: Kerberos and X.509.
IP Security and Key Management) IP Security: Architecture - Authentication header - Encapsulating security payloads - combining security associations - key management.

References:

1. W. Mao, "Modern Cryptography – Theory and Practice", Pearson Education.
2. Charles P. Pfleeger, Shari Lawrence Pfleeger – Security in computing – Prentice Hall of India.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Provide security of the data over the network.
CO-2.	Do research in the emerging areas of cryptography and network security.
CO-3.	Implement various networking protocols.
CO-4.	Protect any network from the threats in the world.

DIPLOMA IN CYBER SECURITY

SEMESTER-II

DCS122: Ethical Hacking

Time: 3 Hrs. **Total Marks: 100**

Credit Hours (per week):4 **Theory Marks: 75**

Total Hours: 60 **Theory Internal Assessment M: 25**

Note: 1. Medium of Examination is English Language.

2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**

Course Objectives:

1.	To explore practical knowledge about ethical hacking methodology.
2.	To learn the importance of evidence handling and storage for various devices.
3.	To understand different types of attacks and their common prevention mechanisms.
4.	To learn how to investigate attacks, technical exploits and router attacks.

UNIT I

Ethical Hacking Overview: Types of Hacking, Advantages of Hacking, Disadvantages Hacking, Purpose of Hacking, Hacker Types, Famous Hackers.

Ethical Hacking: Terminologies, Tools, Skills, Process, Reconnaissance, Footprinting, Fingerprinting, Sniffing, Sniffing Tools, ARP Poisoning-ARP Spoofing, MITM, DNS Poisoning- Defenses against DNS Poisoning.

UNIT-II

Exploitation- Exploit Database, Common Vulnerabilities and Exposures, National Vulnerability Database, Enumeration-Enumeration tools, Metasploit- Exploits of Metasploit, Metasploit Payloads, Trojan Attacks. TCP/IP Hijacking, Email Hijacking, Email Spoofing, Password Hacking, Wireless Hacking, Social Engineering attacks and countermeasures, Wireless DoS, Types of DDoS Attacks, Cross-Site Scripting, SQL Injection, Pen Testing -Types of Penetration Testing.

References:

1. Hacking: A Beginners' Guide to Computer Hacking, Basic Security, And Penetration Testing by John Slavio
2. Hacking: The Art of Exploitation by Jon Erickson
3. Mastering Hacking (The Art of Information Gathering & Scanning) by Harsh Bothra.
4. Baloch, R., Ethical Hacking and Penetration Testing Guide, CRC Press, 2015.
5. Beaver, K., Hacking for Dummies, 3rded. John Wiley & sons, 2013.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	To gain knowledge about Ethical hacking and penetration testing.
CO-2.	To gain knowledge of the tools, techniques and ethical issues likely to face the domain of ethical hacking and ethical responsibilities.
CO-3.	To learn about various types of attacks, attackers and security threats and vulnerabilities present in the computer system.
CO-4.	To learn about basics of web application attacks.
CO-5.	To examine how social engineering can be done by attacker to gain access of useful & sensitive information about the confidential data.

DIPLOMA IN CYBER SECURITY
SEMESTER-II
DCS-123: Computer Hacking & Forensics

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (per week):4 **Theory Marks: 75**
Theory Internal Assessment M: 25

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**

Course Objectives:

1.	To study the fundamentals of Computer Forensics
2.	To learn, analyze and validate Forensics Data
3.	To study the tools and tactics associated with Cyber Forensics
4.	It aims at increasing the knowledge and understanding in cyber security and ethical hacking.

UNIT-I

Computer Hacking: Introduction, Networking & Basics, Foot Printing, Google Hacking, Windows Hacking, Linux Hacking, Trojans, Virus & Worms, Proxy & Packet Filtering , Denial of Service, Sniffer, Social Engineering, Physical Security, Steganography, Cryptography , Wireless Hacking , Firewall , IDS & IPS , Vulnerability, Penetration Testing , Session Hijacking, Hacking Web Servers, SQL Injection, Reverse Engineering, Email Hacking , Incident Handling & Response , Bluetooth Hacking , Mobile Phone Hacking

Computer Forensics Fundamentals: What is Computer Forensics?, Use of Computer Forensics in Law Enforcement, Computer Forensics Services, Benefits of professional Forensics Methodology, Types of Computer Forensics Technology, Computer forensic analysis and validation, Network Forensic.

Unit -II

Current Computer Forensic Tools: Evaluating computer forensic tool needs, computer forensic software tools, computer forensic hardware tools, validating and testing forensic software.

E-mail investigations: Exploring the role of email in investigations, exploring the role of client and server in email, investigating email crimes and violations, understanding email servers, using specialized email forensic tools.

Cell phone and mobile device forensics: Understanding mobile device forensic, understanding acquisition procedures for cell phones and mobile devices.

References:

1. Baloch, R., Ethical Hacking and Penetration Testing Guide, CRC Press, 2015.
2. Beaver, K., Hacking for Dummies, 3rded. John Wiley & sons., 2013.

3. Real Digital Forensics by Keith j.Jones, Richard Bejitlich, Curtis W.Rose, AddisonWesley Pearson Education
4. Forensic Compiling, A Tractitioneris Guide by Tony Sammes and Brain Jenkinson, Springer International edition.
5. Computer Evidence Collection &Presentation by Chrostopher L.T. Brown, Firewall Media.
6. Homeland Security, Techniques & Technologies by Jesus Mena, Firewall Media.
7. Software Forensics Collecting Evidence from the Scene of a Digital Crime by Robert M.Slade, TMH 2005
8. Windows Forensics by chad Steel, Wiley India Edition.

Course Outcomes:

After completion of this course students will be able to:

CO-1.	Identify the process in taking digital evidence.
CO-2.	Describe how to conduct an investigation using methods of memory, operating system, network and email forensics.
CO-3.	Assess the different forensics tools.
CO-4.	Differentiate among different types of security attacks.
CO-5.	Describe the concept of ethical hacking.

DIPLOMA IN CYBER SECURITY
SEMESTER-II
DCS-124P
Lab I - Security & Cryptography

Credit Hours (per week):4 **Total Marks: 100**
Total Hours: 60 **Practical Marks: 75**
Practical Internal Assessment M: 25

Course Objectives:

Enable the student to

1.	To understand basics of Cryptography and Network Security.
2.	To be able to secure a message over insecure channel by various means
3.	To learn about how to maintain the Confidentiality, Integrity and Availability of a data.
4.	To understand various protocols for network security to protect against the threats in the networks.

Practical Implementation based on Security & Cryptography

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Provide security of the data over the network.
CO-2.	Do research in the emerging areas of cryptography and network security.
CO-3.	Implement various networking protocols.
CO-4.	Protect any network from the threats in the world.

DIPLOMA IN CYBER SECURITY
SEMESTER-II
DCS125P
Lab II- Computer Hacking & Forensics

Credit Hours (per week):4 **Total Marks: 100**
Total Hours: 60 **Practical Marks: 75**
Practical Internal Assessment M: 25

Course Objective:

1.	Aim of this course is to teach deep understanding of security issues and digital forensics & incident response.
2.	In addition, this course also provides the students with specialist knowledge and experience of various digital forensics techniques and incident response.

Practical Implementation based on Hacking & Forensics

Course Outcomes:
On Completing the course, the students will be able to:

CO-1.	Understanding of various digital forensics techniques and its usage for the potential countermeasures or incident response.
CO-2.	Demonstrate a critical evaluation and use of digital forensics technique to do incident response with an independent project.
CO-3.	Apply the knowledge to discuss about existing case studies.
CO-4.	Design a method to solve a problem in different perspective.

SYLLABUS FOR THE BATCH FROM THE YEAR 2022 TO YEAR 2023

Programme Code: DMA

Programme Name: DIPLOMA IN MOBILE APPLICATIONS

(Semester I-II)

Examinations: 2022-2023

P.G. Department of Computer Science & Applications

Khalsa College, Amritsar

Programme name: DIPLOMA IN MOBILE APPLICATIONS
Programme code: DMA
Programme Duration 1 years

Programme Objectives:

1.	Provides career options for learners in the emerging technology sector of Mobile Applications. The learner will possess the competent knowledge and skills to seek jobs in this sector.
2.	The programme provides comprehensive knowledge, technical expertise and hands-on experience.
3.	Provides students with an understanding of major aspects of mobile technologies. Learner will have an in-depth knowledge of Java and Android application development and testing of mobile apps
4.	Prepare students to develop mobile apps for various platforms.

Program Specific Outcomes (PSOs)

PSO-1.	Identify various concepts of mobile programming that make it unique from programming for other platforms, Use several different operating systems for the development and implementation of programs in business and technical environments.
PSO-2.	Measure the performance of security systems within an enterprise-level information system. Troubleshoot, maintain and update an enterprise-level information security system.
PSO-3.	Program mobile applications for the Android operating system that use basic and advanced phone features, and Deploy applications to the Android marketplace for distribution.

DIPLOMA IN MOBILE APPLICATIONS

Semester – I

Sr. No.	Paper	Paper Name	Marks				Page no.
			Theory	Practical	Internal	Total	
1	DMA-111	Mobile OS	75	-	25	100	557-558
2	DMA-112	Object Oriented Concept & Programming Using Java	75	-	25	100	559-560
3	DMA-113	Android Mobile Application Development	75	-	25	100	561-562
4	DMA-114P	Lab I - Programming Using Java	-	75	25	100	563
5	DMA-115P	Lab II- Android Mobile Application Development	-	75	25	100	564

DIPLOMA IN MOBILE APPLICATIONS
SEMESTER-I

DMA-111: Mobile OS

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (per week):4 **Theory Marks: 75**
Total Hours: 60 **Theory Internal Assessment M: 25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

COURSE OBJECTIVE:

1.	To understand the basic concepts and functions of operating systems.
2.	To understand Processes, Threads and Deadlocks
3.	To acquire knowledge of mobile operating systems: their architectures, services and life-cycle, as well as skills to implement mobile solutions on a particular hardware platform.
4.	To know the components and management aspects of Real time, Mobile operating systems
5.	To be familiar with the basics of Mobile OS like iOS and Android.

UNIT-I

Fundamentals of programming OOP concepts and SQL Queries, Basics of Designing, Overview of MAC OS and Unix

Introduction to application development for windows phone Application life cycle, syntax and semantics of visual studio, design and build windows phone app, integrating map and location in app.

Learning Objective C Data Types, Operators, Loop, Files Inheritance, Method Overloading, Mutable and Immutable Strings, Mutable and Immutable Arrays, File Management.

UNIT-II

Introduction to iPhone OS, Introduction to iPhone Architecture, Essential COCOA Touch Classes, Interface Builder, Nib File, COCOA and MVC Framework, Overview of features of latest ios. Tracking the iOS life cycle,Application Development in iPhone Controls and Gestures, Controllers and Memory Management, Connecting Outlets, Managing Application Memory, Advance Controllers Programming,

Views (Alert View, Table Views, Picker, Date and Time, Image), Navigation Based Application Development, Tab Bar and Tool Bar, Audio and Video
Database integration with SqLiteSqLite, Creating Outlets and Actions, Overview of Networking-SCNetwork, CFHTTP, CFFTP, CFSocket, Berkeley Sockets, Web Server. Deploying your iOS app Deploying the app to Beta Tester, Registering Beta device, generating digital certificates, submitting app to Apple by registering Apple Id, Validating and submitting App.

References:

1. Building iPhone and iPad Electronic Projects - MikeWesterfield - O'Reilly Media Pub.
2. Head First iPhone and iPad Development, 2nd Edition - Dan Pilone, Tracey Pilone – O'Reilly Media
3. Beginning iOS Programming – Building and deploying iOS application, Nick Harris, Wrox Publication.

Course Outcomes

At the end of the course, the students should be able to:

C0-1	Analyze modern mobile OS architectures, inter process communications, understand OS lifecycle.
C0-2	Understand the functionality of file systems.
C0-3	Compare iOS and Android Operating Systems
C0-4	Can understand Android Security Model

DIPLOMA IN MOBILE APPLICATIONS
SEMESTER-I

DMA-112: Object Oriented Concept & Programming Using Java

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (per week):4 **Theory Marks: 75**
Total Hours: 60 **Theory Internal Assessment M: 25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**

Course Objective:

1.	To become familiar with the features of Java Language
2.	To discover how to write Java code according to Object-Oriented Programming principles.
3.	To become comfortable with concepts such as Classes, Objects, Inheritance, Polymorphism and Interfaces
4.	To understand how to design, implement, test, debug, and document programs that use basic data types and computation, simple I/O, conditional and control structures, string handling and functions.
5.	To understand the importance of Classes & objects along with constructors, Arrays and Vectors.
6.	Discuss the principles of inheritance, interface and packages and demonstrate though problem analysis assignments how they relate to the design of methods, abstract classes and interfaces and packages.
7.	To understand importance of Multi-threading & different exception handling mechanisms.

UNIT-I

The Java Environment: Installing Java, Java Program Development, Java Source File Structure, Compilation, Execution.

Introduction to Programming language: Introduction to Concepts of Programming: Introduction to Java, JVM, and Features of java, JDK Environment & tools like (java, javac, applet viewer, java doc, jdb).

Basic Language Elements: Lexical Tokens, Identifiers, Keywords, Literals, Comments, Primitive Data types, Operators Assignment, Naming Convention, Decision Making (if, switch), Looping(for, while) , Type Casting.

Object Oriented Concepts: Creating Classes and objects, Memory allocation for objects, Constructor, Implementation of Inheritance (Simple, Multilevel, Hierarchical), Implementation of Polymorphism (Method Overloading , Method Overriding).

UNIT-II

Arrays Strings and Vectors : Arrays: Creating an array, Types of Array (One Dimensional arrays, Two Dimensional array). Strings: String – Arrays, String Methods, String Buffer class. Introduction to Vectors.

Interface, Packages and Abstract Class: Modifiers and Access Control (Default, public, private, protected). Abstract classes and methods. Packages: Concept, Creating user defined packages, Java Built in packages(Java.lang->math , Java.util->Random, Date, Hash Table).

Multithreading: Creating Threads using Different methods, Thread Priorities, Thread Synchronization, Inter process thread Communication.

Exception Handling: Exception types, Using try catch and multiple catch, Nested try, throw throws and finally, Creating User defined Exceptions.

References:

1. "Java–The Complete Reference", Herbert Schildt, Tata MacGraw Hill.
2. "Introduction to Java Programming", Y. Daniel Mliang, Pearsons Publications.
3. Programming with JAVA - E Balgurusamy
4. JAVA:How to Programm- Paul Deital and Harvey Deital.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Implement Object Oriented programming concept using basic syntaxes of control Structures, strings and function for developing skills of logic building activity.
CO-2.	Identify classes, objects, members of a class and the relationships among them needed for a finding the solution to specific problem
CO-3.	Demonstrates how to achieve reusability using inheritance, interfaces and packages and describes faster application development can be achieved.
CO-4.	Demonstrate understanding and use of different exception handling mechanisms and concept of multithreading for robust faster and efficient application development.
CO-5.	Identify and describe common abstract user interface components to design GUI in Java using Applet & AWT along with response to events.

DIPLOMA IN MOBILE APPLICATIONS
SEMESTER-I
DMA-113: Android Mobile Application Development

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (per week):4 **Theory Marks: 75**
Total Hours: 60 **Theory Internal Assessment M: 25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Instructions for Paper Setters:
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

Course Objectives:

1.	This course teaches fundamentals and history of android programming using the Android SDK.
2.	Understand the fundamental components and lifecycle of an Android application.
3.	It helps to inculcate working knowledge of Android Studio development tool.
4.	Provides knowledge to creating robust mobile applications and learn how to integrate them with other services
5.	Using Android Studio, Android virtual devices, and physical devices to build and test Android apps.
6.	Develop applications that work across a heterogeneous set of devices

UNIT-I

Introduction to Android: Overview of Android - An Open Source Platform for Mobile development, Android SDK, Eclipse Installation, Android Installation, Understanding Anatomy of Android Application, Open Handset Alliance, Tools and software required for an android application, Building your First Android application.

Android Development Framework: Basics of Operating Systems, Java Development Kit, Android Development Tools(ADT), Emulators, AVDs, Steps to Install and configure Android studio and SDK, Android API levels (versions & version names).

UNIT-II

Designing Android UI Layout: Fundamental of Android UI Design, Android application components: Intents, Activity, Activity Lifecycle, Broadcast receivers, Services and Manifest, Expressions and Flow control, Simple UI -Layouts and Layout properties, Creating new Layouts, Draw able Resources, Resolution and density independence.

User Interface Design: Form widgets, Text Fields, Menu: Option menu, Context menu ,Sub menu, Time and Date, Images and media, Alert Dialogs & Toast, Popup, checkbox, Buttons, Radio Buttons, Lists, Scroll view ,Time and Date Picker.

Testing and Deployment: Testing Android applications, Publishing Android application, Using Android preferences, Managing Application resources in a hierarchy, working with different types of resources.

References:

1. Reto Meier "Professional Android 2 Application Development" Wiley India Pvt Ltd.
2. Beginning Android "Mark L Murphy" Wiley India Pvt Ltd.
3. Lauren Darcey and Shane Conder, "Android Wireless Application Development", Pearson Education, 2nd ed.
4. Android Application Development All in one for Dummies by Barry Burd, Edition: I

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Install and configure Android application development tools.
CO-2.	Demonstrate their understanding of the fundamentals of Android operating systems.
CO-3.	Design mobile applications with more than one user interface and more than one system component.
CO-4.	This course helps to become a certified Android developer.
CO-5.	Apply Java programming concepts to Android application development.

DIPLOMA IN MOBILE APPLICATIONS

SEMESTER-I

DMA-114P

Lab I - Programming Using Java

Credit Hours (per week):4 **Total Marks: 100**

Total Hours: 60 **Practical Marks: 75**

Practical Internal Assessment M: 25

Course Objectives:

1.	To become familiar with the features of Java Language
2.	To discover how to write Java code according to Object-Oriented Programming principles.
3.	To become comfortable with concepts such as Classes, Objects, Inheritance, Polymorphism and Interfaces
4.	To understand how to design, implement, test, debug, and document programs that use basic data types and computation, simple I/O, conditional and control structures, string handling and functions.
5.	To understand the importance of Classes & objects along with constructors, Arrays and Vectors.
6.	Discuss the principles of inheritance, interface and packages and demonstrate though problem analysis assignments how they relate to the design of methods, abstract classes and interfaces and packages.
7.	To understand importance of Multi-threading & different exception handling mechanisms

Practical Implementation Based on Programming Using Java

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Implement Object Oriented programming concept using basic syntaxes of control Structures, strings and function for developing skills of logic building activity.
CO-2.	Identify classes, objects, members of a class and the relationships among them needed for a finding the solution to specific problem.
CO-3.	Demonstrates how to achieve reusability using inheritance, interfaces and packages and describes faster application development can be achieved.
CO-4.	Demonstrate understanding and use of different exception handling mechanisms and concept of multithreading for robust faster and efficient application development.
CO-5.	Identify and describe common abstract user interface components to design GUI in Java using Applet & AWT along with response to events.

DIPLOMA IN MOBILE APPLICATIONS

SEMESTER-I

DMA-115P

Lab II - Android Mobile Application Development

Credit Hours (per week):4 **Total Marks: 100**

Total Hours: 60 **Practical Marks: 75**

Practical Internal Assessment M: 25

Course Objectives:

1. This course provides practical exposure to fundamentals concepts of android programming using the Android SDK.
2. To understand the practical implementation of components and lifecycle of an Android application.
3. Provides practical knowledge about android development framework.
4. Step by step implementation of theoretical concepts learnt by student.
5. Hands on knowledge of using Android Studio, Android virtual devices, and physical devices to build and test Android apps.
6. Development of applications that work across a heterogeneous set of devices

Practical Implementation Based on Android Mobile Application Development

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Complete knowledge of installation and configuration of Android application development tools.
CO-2.	Demonstrate the understanding of the fundamentals of Android operating systems.
CO-3.	Developing mobile applications with multiuser interface and more than one system component.
CO-4.	Nourishing and enhancing the programming skills that helps to become a certified Android developer.
CO-5.	Implementation of Java programming concepts for Android application development

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DIPLOMA IN MOBILE APPLICATIONS
Semester – II

Sr. No.	Paper	Paper Name	Marks				Page No.
			Theory	Practical	Internal	Total	
1	**DMA-121**	Cross Platform Mobile Application Development	**75**	**-**	**25**	**100**	**566-567**
2	**DMA-122**	Introduction to Windows mobile & IOS	**75**	**-**	**25**	**100**	**568-569**
3	**DMA-123**	Advanced Android Mobile Application Development	**75**	**-**	**25**	**100**	**570-571**
4	**DMA-124P**	Lab I- Introduction to Windows Mobile & IOS	**-**	**75**	**25**	**100**	**572**
5	**DMA-125P**	Lab II- Advanced Android Mobile Application Development	**-**	**75**	**25**	**100**	**573**

DIPLOMA IN MOBILE APPLICATIONS
SEMESTER-II

DMA-121: Cross Platform Mobile Application Development

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (per week):4 **Theory Marks: 75**
Total Hours: 60 **Theory Internal Assessment M: 25**

Note: The question paper covering the entire course shall be divided into three sections.

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from UNIT-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from UNIT-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

Objectives:

1.	This subject teaches students the concepts, tools and techniques needed to develop quality mobile apps.
2.	Students will learn about different mobile architectures and analyse different approaches for creating effective user interfaces for multiple scenarios.
3.	The major objective is to provide students with understanding of languages used in development of Mobile Applications.

UNIT – I

HTML5 & CSS3: Introduction to Mobile applications, cross platform Mobile applications, History of Mobile applications and platforms, Current mobile platforms, List Development tools used in mobile application, List Languages used in mobile application, About HTML5,List New features in HTML5, HTML5 based Mobile Applications, List HTML5 API features, defining new elements, new attribute syntax, semantic elements, input elements in HTML5, Canvas, Scalable Vector graphics, media Types in HTML5,Discuss HTML5 geo location API, HTML5 local storage,

Introduction to CSS3: List New Features in CSS3, CSS3 Selectors, CSS3 box model, CSS3 borders, CSS3 backgrounds, CSS3 new colours, gradients, shadows, CSS3 transformation, 2D and 3D transformations, Transitions, Animations, CSS3 box sizing, CSS3 Flex boxes

UNIT– II

Ionic frameworks: Introduction to Mobile user Interface Development, List UI development Frameworks, Ionic Framework, List Support and Features of Ionic Framework, Demonstrate Installing Ionic frameworks, platform supports (iOS and Android), Demonstrate Creating a User Interface project in Ionic, Ionic elements, lists, menus, slide boxes, refreshing, Ionic NetBeans, Demonstrate Building Ionic UI applications, Demonstrate Testing Ionic Applications

References

1. Beginning Android Web Apps Development: Develop for Android using HTML5, CSS3, and JavaScript, By Jon Westfall, Rocco Augusto, Grant Allen, Publisher: Apress

Course Outcomes (COs):

On Completing the course, the students will be able to:

CO-1.	On successful completion of this subject the students will able to compare and contrast a variety of mobile applications.
CO-2.	Students would be capable of developing various applications to solve real world problems.
CO-3.	Students would be able to explain the process required to create applications which run across multiple architectures.

DIPLOMA IN MOBILE APPLICATIONS
SEMESTER-II
DMA-122: Introduction to Windows Mobile & IOS

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (per week):4 **Theory Marks: 75**
Total Hours: 60 **Theory Internal Assessment M: 25**

Note: The question paper covering the entire course shall be divided into three sections.
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from UNIT-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from UNIT-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

Objectives:

1.	This subject will help learners to design and develop a simple mobile app in Windows and iOS.
2.	This course also covers the programming language concepts, overview of networking, database concepts and SQL queries.
3.	It also covers the architecture of Windows and IOS.

UNIT-I

Fundamentals of programming OOP concepts and SQL Queries, Basics of Designing, Overview of MAC OS and X-Code.
Introduction to application development for windows phone Application life cycle, syntax and semantics of visual studio 2013, design and build windows phone app, integrating map and location in app, advanced topics.
Learning Objective C Data Types, NSInteger, NSNumber, Operators, Loop, Introduction to .H and .M, Files Inheritance, Method Overloading, Mutable and Immutable Strings, Mutable and Immutable Arrays, File Management.

UNIT-II

Introduction to iPhone OS Introduction to iPhone Architecture, Essential COCOA Touch Classes, Interface Builder, Nib File, COCOA and MVC Framework, Overview of features of latest ios. Application Development in iPhone Controls and Gestures, Controllers and Memory Management, Using Application

Delegate, Connecting Outlets, Managing Application Memory, Advance Controllers Programming, Views (Alert View, Table Views, Picker, Date and Time, Image), Navigation Based Application Development, Tab Bar and Tool Bar, Audio and Video, Releasing Memory, Reading PDF File in iPhone Simulator, Animation, Accelerometer, Location Services and 2-D Graphics, Email Sending, XML Parsing, JSON Parsing, Web Services Integration, Exploring maps and local search.
Database integration with SqLite SqLite, Creating Outlets and Actions, Parsing Data with SqLite, Overview of Networking- SCNetwork, CFHTTP, CFFTP, CFSocket, Berkeley Sockets, Web Server. Deploying your iOS app Deploying the app to Beta Tester, Registering Beta device, generating digital certificates, submitting app to Apple by registering Apple Id, Validating and submitting App.

References:

4. Building iPhone and iPad Electronic Projects - MikeWesterfield - O'Reilly Media Pub.
5. Head First iPhone and iPad Development, 2nd Edition - Dan Pilone, Tracey Pilone – O'Reilly Media
6. Beginning iPhone and iPad Web Apps - ChrisApers, Daniel Paterson - Apress Pub
7. Beginning iOS Programming – Building and deploying iOS application, Nick Harris, Wrox Publication.

Course Outcomes(COs):

On Completing the course, the students will be able to:

C0-1	Able to design simple apps with database and coding concepts.
C0-2	Learn how to use and handle the database for apps in Windows and ios.

DIPLOMA IN MOBILE APPLICATIONS
SEMESTER-II
DMA-123: Advanced Android Mobile Application Development

Time: 3 Hrs. **Total Marks: 100**
Credit Hours (per week):4 **Theory Marks: 75**
Total Hours: 60 **Theory Internal Assessment M: 25**

Note: The question paper covering the entire course shall be divided into three sections.
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from UNIT-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from UNIT-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

Course Objectives:

1.	To facilitate students to understand android SDK
2.	To help students to gain advanced understanding of Android application development
3.	To inculcate working knowledge of Android Studio development tool.
4.	To understand working with databases under the Android operating system.
5.	To understand how to use Mapping and Location Based Services

UNIT-I

Advanced UI Programming: Developing event driven Programming in Android, Event driven Programming in Android (Text Edit, Button clicked etc.), Creating a splash screen, Android Activity Lifecycle, Introduction to threads in Android.
Menu, Dialog, List and Adapters: Develop application with menus and dialog boxes, Menu: Custom Vs. System Menus, Creating and Using Handset menu Button (Hardware), Android Themes, Dialog, create an Alter Dialog, Toast in Android, List & Adapters, Android Manifest.xml File.
Multimedia in Android: Multimedia Supported audio formats, Simple media playback, Supported video formats, Simple video playback.

UNIT-II

Working with Database: Introducing SQLite, SQLiteOpenHelper and creating a database, Opening and closing a database.
Data Storage, Retrieval and Sharing: Android Techniques for Saving Data, Saving Simple Application Data, Creating and Saving Preferences, Retrieving Shared Preferences, Saving Activity State, Creating a Preferences Page, Saving and Loading Files.

Mapping and Location Based Services: Using Location Based Services, Setting up your Emulator with Location Based Services, Selecting a Location Provider, Finding Your Location.

References:

1. Professional Android 2 Application Development by Reto Meier ,Wiley India Pvt Ltd
2. Beginning Android by Mark L Murphy, Wiley India Pvt Ltd
3. Professional Android by Sayed Y Hashimi and Satya Komatineni, Wiley India Pvt Ltd

Course Outcomes

On Completing the course, the students will be able to:

CO-1.	Describe the platforms upon which the Android operating system will run.
CO-2.	Create an application that uses multimedia under the Android operating system.
CO-3.	Access and work with databases under the Android operating system.
CO-4.	Create a simple application that runs under the Android operating system.
CO-5.	Understand how to use Mapping and Location Based Services.

DIPLOMA IN MOBILE APPLICATIONS
SEMESTER-II
DMA-124P
Lab I- Introduction to Windows Mobile & IOS

Credit Hours (per week):4 **Total Marks: 100**
Total Hours: 60 **Practical Marks: 75**
Practical Internal Assessment M: 25

Objectives:

1. This practical lab will help learners to design and develop a simple mobile applications in Windows and iOS.
2. This course also covers the looping concepts, Inheritance concepts, overloading concepts, overview of networking, database concepts and SQL queries.
3. It also covers the Navigation Based Application Development, Tab Bar and Tool Bar, Audio and Video.

Practical Implementation Based on Windows Mobile

Course Outcomes (COs):

On Completing the course, the students will be able to:

C0-1	Students will be able to design different types of real-world applications with database and coding concepts.
C0-2	Students will be able to do testing, and managing the application memory.

DIPLOMA IN MOBILE APPLICATIONS
SEMESTER-II
DMA-125P
Lab II- Advanced Android Mobile Application Development

Credit Hours (per week):4 **Total Marks: 100**
Total Hours: 60 **Practical Marks: 75**
Practical Internal Assessment M: 25

COURSE OBJECTIVES:

1.	To facilitate students to understand android SDK
2.	To help students to gain a basic understanding of Android application development
3.	To inculcate working knowledge of Android Studio development tool

Practical Implementation Based on Advanced Android Mobile Application Development

Program Outcomes
On Completing the course, the students will be able to:

C0-1	Describe the platforms upon which the Android operating system will run.
C0-2	Create a simple application that runs under the Android operating system.
C0-3	Access and work with the Android file system.
C0-4	Create an application that uses multimedia under the Android operating system.
C0-5	Access and work with databases under the Android operating system.

SYLLABUS FOR THE BATCH FROM THE YEAR 2022 TO YEAR 2023

Programme Code: DCHNM

Programme Name: Diploma in Computer Hardware & Network Maintenance

(Semester I-II)

Examinations: 2022-2023

P.G. Department of Computer Science & Applications

Khalsa College, Amritsar

Programme name: Diploma in Computer Hardware & Network Maintenance
Programme code: DCHNM
Programme Duration :1 year

Programme Objectives:

1.	Understand basic concept & structure of Computer Hardware & Networking Components.
2.	Student will be able to understand the hardware specifications that are required to run operating system and various application programs. Also, upgrading of existing hardware/software as and when required.
3.	Identify the existing configuration of the computers & peripherals.
4.	Manage data backup & restore operations.
5.	To enhance student's skill in Computer Maintenance, Assembly, Installations, Virus Protection, troubleshooting.

Program Specific Outcomes (PSOs)

PSO-1.	Troubleshoot, configure and operate data communications systems.
PSO-2.	Use several different operating systems for the development and implementation of programs in business and technical environments.
PSO-3.	Students will be able to assemble a computer with essential components.
PSO-4.	Students will be able to troubleshoot hardware components.

DIPLOMA COURSE IN COMPUTER HARDWARE AND NETWORK MAINTENANCE

SEMESTER – I

Sr. No.	Paper Code	Skill Component / General Education	Paper Name	Marks				Page No.
				Theory	Practical	Internal	Total	
1	DCSE-1126	General Education	Communication Skills-I	**30**	**45**	**10Th. 15 Prac.**	**100**	**577-579**
2	DCHNM-111	General Education	Computer Fundamentals-I	**30**	**45**	**10 Th. 15Prac.**	**100**	**580-583**
3	DCHNM-112	Skill Component	Computer Hardware	**30**	**45**	**10 Th. 15Prac.**	**100**	**584-585**
4	DCHNM-113	Skill Component	PC-Maintenance and Troubleshooting – I	**30**	**45**	**10 Th. 15Prac.**	**100**	**586-587**
5	DCHNM-114	Skill Component	Computer Assembling and Installation	**30**	**45**	**10 Th. 15Prac.**	**100**	**588-589**

DIPLOMA COURSE IN COMPUTER HARDWARE AND NETWORK MAINTENANCE

SEMESTER – I

DCSE-1126: COMMUNICATION SKILLS-I (THEORY)

Time: 3 Hrs. **M.M: 100**
Credit Hours (per week):4 **Theory Marks: 30**
Total Hours: 60 **Theory Internal Assessment Marks: 10**
Practical Marks: 45
Practical Internal Assessment Marks: 15

Instructions for the Paper Setters: -

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Course Objectives:

1.	Become a more effective communicator through the application of practical tools.
2.	It engages the choice and use of an effective channel and presentation of information to the target audience.
3.	The main objective is to articulate the inner thoughts in a more channelized manner.
4.	The mutual understanding of our needs, wishes, hopes.

SECTION A

Writing Skills

Formatting personal and business letters:

1. Standard informal personal letters such as letters to parents, friends, social pillars.
2. Standard formal letters to Govt. Officers, superiors, utility purposes, News Paper Editors etc.
3. Standard Business Letters: Introducing and Promoting business activities, Placing an order, Cancelling an order, Reporting defects in receipt of ordered goods, Reporting delay in receipt of ordered goods, Responding to delay in supply of goods and services, Maintaining good customer relationships, Making customers give feedback to your services, Creating catalogue of your goods and services, Acknowledging services rendered by others

SECTION B

1. Resume Writing.
2. Writing of memos, notices and customer-friendly information.
3. Basic punctuation.
4. Blog writing

SECTION C

Speaking Skills

1. Using courtesy words and expressions
2. Storing standard day to day usages sentences, words and expressions in mind.
3. Creating similar new sentences
4. Using declarative, imperatives, interrogative and exclamatory sentences.

SECTION D

1. Speaking catchy phrases , proverbs and expressions
2. Differentiating confusing words
3. Making PowerPoint presentation
4. Making short speech
5. Group Discussion/ Conversation

References:

1. KK Ramchandran, et al Business Communication, Macmillan, New Delhi
2. Swati Samantaray, Business Communication and Communicative English, Sultan Chand, New Delhi.
3. S.P. Dhanavel English and Communication Skills for Students of Science and Engineering (with audio CD)
4. Computer Mediated Communication 1st Edition by Crispin Thurlow Lara Martin Lengel , Alice Tomic.
5. Collins, Patrick. Speak with Power and Confidence. New York: Sterling, 2009.
6. Fitikides, T. J. Common Mistakes in English. London: Orient Longman.

Course Outcomes:

CO-1.	One's point of view is understood by others.
CO-2.	The main outcome is to socialize and be in touch with the community.
CO-3.	Master the method for speaking on the spot.
CO-4.	Learn how to effectively utilize pitch, tone and speed

DIPLOMA COURSE IN COMPUTER HARDWARE AND NETWORK MAINTENANCE

SEMESTER – I

DCSE-1126: COMMUNICATION SKILLS-I (PRACTICAL)

Instructions for Practical Exam: Entire syllabus will be covered for practical.

1. Speaking Skills
2. Using courtesy words and expressions
3. Storing standard day to day usages sentences, words and expressions in mind.
4. Speaking catchy phrases , proverbs and expressions
5. Making PowerPoint presentation
6. Making short speech
7. Group Discussion/ Conversation

DIPLOMA COURSE IN COMPUTER HARDWARE AND NETWORK MAINTENANCE

SEMESTER – I

DCHNM-111: Computer Fundamentals-I (THEORY)

Time: 3 Hrs. **M.M: 100**

Credit Hours (per week):4 **Theory Marks: 30**

Total Hours: 60 **Theory Internal Assessment Marks: 10**

Practical Marks: 45

Practical Internal Assessment Marks: 15

Instructions for the Paper Setters: -

Medium of Examination is English Language.

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Course Objectives:

1.	Teach the fundamentals so students can efficiently use MS Word
2.	Provide a knowledge base for Computer Fundamentals & MS Word upon which you can build.
3.	Use real-world examples and procedures that will prepare you to be a skilled user of Computer & MS Word, MS Power Point & MS Excel.

SECTION A

Interacting with the computer:

Computer Components/ Input/ Output Devices: Input devices; keyboard, mouse, scanner, output devices; VDU and printer (impact and non-impact printers), plotter etc. Primary and secondary storage (auxiliary storage), secondary storage; magnetic disks – tracks and sectors, optical disk (CD, CD-RW and DVD memory).

Computer Software concept: System software, application software, operating systems, and advantages of software and application packages. Introduction to operating systems such as ms-dos and windows, difference between dos and windows

Operating system-MS-Windows

Operating system-Definition & functions, basics of Windows, Basic components of windows, icons, types of icons, taskbar, activating windows, using desktop, title bar, running applications, exploring computer, managing files and folders, copying and moving files and folders, Control panel – display properties, adding and removing software and hardware, setting date and time, screensaver and appearance, Using windows accessories.

SECTION B

Word Processor using Microsoft Office

Introduction to Word, Introduction to Parts of Word Window (Title Bar, Menu Bar, Tool Bar,

The Ruler, Status Area), Page Setup, Creating New Documents, Saving Documents, Opening an Existing documents, insert a second document into an open document, Editing and formatting in document, Headers and Footers, Spell Checking, Printing document, Creating a Table Using the Table Menu and table formatting, Borders and Shading, Templates and Wizards, Mail Merge, importing, exporting and inserting files, formatting pages, paragraphs and sections, indents and outdents, creating lists and numbering, Headings, styles, fonts and font size Editing, positioning and viewing texts, Finding and replacing text, inserting page breaks, page numbers , book marks, symbols and dates

SECTION C

Presentation Software using Microsoft Office

Introduction to MS Power point, Power point elements, Templates, Wizards, Views, Exploring Power Point Menu, Working with Dialog Boxes, Adding Text, Adding Title, Moving Text Area, Resizing Text Boxes, Adding Art, Starting a New Slide, Starting Slide Show, Saving presentation; Printing Slides, Views (View slide sorter view, notes view, outlines view) Formatting and enhancing text formatting, Creating Graphs (Displaying slide show and adding multi – media)

SECTION D

Spreadsheet using Microsoft Office

Elements of Electronics Spread Sheet and Ms-Excel: Application/usage of Electronic Spread Sheet, Opening of Spread Sheet, and menu bar, Creation of cells and addressing of cells, Cell inputting.

Manipulation of cells: Enter texts numbers and dates, Creation of tables, Cell Height and Widths, Copying of cells.

Functions: Using functions: mathematical, statistical and financial function.

Spread sheets for Small accountings: Maintaining invoices/budgets, Totaling of various transactions, maintaining daily and monthly sales reports.

Charts: drawing different types of charts.

References:

1. Andrew S. Tanenbaum, David J. Wetherall Computer Networks (5th Edition), PHI.
2. P. K.Sinha, P. Sinha, Fundamentals of Computers, BPB Publishers.
3. A. Goel, Computer Fundamentals, Pearson Education.
4. Will Train, Gini Corter, Annette Marquis “Microsoft Office” BPB

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Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Describe the usage of computers and why computers are essential components in business and society.
CO-2.	Solve common problems using appropriate Computer Fundamentals.
CO-3.	Identify categories of programs, system software and applications. Organize and work with files and folders.
CO-4.	Describe the important computer system resources and the role of operating system in their management policies and algorithms.

DIPLOMA COURSE IN COMPUTER HARDWARE AND NETWORK MAINTENANCE

SEMESTER – I

DCHNM-111: Computer Fundamentals-I
(PRACTICAL)

Instructions for Practical Exam: Entire syllabus will be covered for practical.

1. Operating system-MS-Windows

Basic components of windows, icons, types of icons, taskbar, activating windows, using desktop, title bar, running applications, exploring computer, managing files and folders, copying and moving files and folders, Control panel – display properties, adding and removing software and hardware, setting date and time, screensaver and appearance, Using windows accessories.

2. Word Processor using Microsoft Office

Parts of Word Window (Title Bar, Menu Bar, Tool Bar, The Ruler, Status Area), Page Setup, Creating New Documents, Saving Documents, Opening an Existing documents, insert a second document into an open document, Editing and formatting in document, Headers and Footers, Spell Checking, Printing document, Creating a Table Using the Table Menu and table formatting, Borders and Shading, Templates and Wizards, Mail Merge, importing, exporting and inserting files, formatting pages, paragraphs and sections, indents and outdents, creating lists and numbering, Headings, styles, fonts and font size Editing, positioning and viewing texts, Finding and replacing text, inserting page breaks, page numbers , book marks, symbols and dates.

3. Presentation Software using Microsoft Office

Power point elements, Templates, Wizards, Views, Exploring Power Point Menu, Working with Dialog Boxes, Adding Text, Adding Title, Moving Text Area, Resizing Text Boxes, Adding Art, Starting a New Slide, Starting Slide Show, Saving presentation; Printing Slides, Views (View slide sorter view, notes view, outlines view) Formatting and enhancing text formatting, Creating Graphs (Displaying slide show and adding multi – media)

4. Spreadsheet using Microsoft Office

Elements of Electronics Spread Sheet and Ms-Excel: Opening of Spread Sheet, menu bar, Creation of cells and addressing of cells, Cell inputting.
Manipulation of cells: Enter texts numbers and dates, Creation of tables, Cell Height and Widths, Copying of cells.
Functions: Using functions: mathematical, statistical and financial function.
Spread sheets for Small accountings: Maintaining invoices/budgets, Totaling of various transactions, maintaining daily and monthly sales reports.
Charts: drawing different types of charts.

DIPLOMA COURSE IN COMPUTER HARDWARE AND NETWORK MAINTENANCE

SEMESTER – I

DCHNM-112: COMPUTER HARDWARE

Time: 3 hrs. **M.M: 100**

Credit Hours (per week):4 **Theory Marks: 30**

Total Hours: 60 **Theory Internal Assessment Marks: 10**

Practical Marks: 45

Practical Internal Assessment Marks: 15

Instructions for the Paper Setters: - Medium of Examination is English Language.

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Instructions for Practical Exam: Entire syllabus will be covered for practicals.

Course Objectives:

1.	To indicate the names and functions of hardware ports and the parts of the motherboard.
2.	Description of how the CPU processes data and instructions and controls the operation of all other devices.
3.	Comparison of various data storage devices, including flash drive, external hard drive, memory card, discs.
4.	Identification of various display adapters CGA, PGA, XGA etc.
5.	To provides the necessary knowledge and skills regarding working construction and interfacing aspects of computer peripherals.

SECTION-A

Motherboards

Introduction – Functions – Types – Forms Factors – Modern Motherboards – Sockets – Slots – Motherboards 440BX-810, 810E, 815, 815E-820-Athlon – P4 – Dual PIII – Maintenance **Supporting chips:** Introduction – Types – Clocks Generator – Bus Conductor – PIC-DMAC-PIT-PPI-RTC

SECTION-B

Memory: Introduction – Organization – Primary – Secondary – DRAM – SRAM-Modules – SIMM – SIPP –DIMM – Asynchronous DRAM – Synchronous DRAM – Memory Requirement – Memory Upgrade – Errors – Parity Checking – Trouble shooting

SECTION-C

Logical Memory: Introduction – Real Mode Memory – Conventional Memory – UMA – Extended Memory – HMA – EMS – ROM – Shadowing – Optimization – Performance Improvement

SECTION-D

Display Adapters: Introduction – Display Subsystem – Evolution – Types – Components – Interfaces – Modes – MDA – CGA – EGA – VGA – PGA – XGA – SVGA – VESA – SVGA Standardization

Graphic Accelerators: Introduction – Cards – Accelerated Graphic Ports – 3D Cards – Upgrading – Troubleshooting

References:

1. Upgrading and Repairing PCs by Scott Mueller.
2. PC Hardware: The Complete Reference by Craig Zacker

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Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	By the end of the course, Students will understand various components of a computer system like motherboard and display adapter.
CO-2.	Learn about the different types of memory modules.
CO-3.	Knowledge about the different types of connectors and ports of a PC.
CO-4.	Understanding of the interfacing, installation, working of graphic cards.
CO-5.	Familiarity with the different types of expansion slot (ISA, EISA, PCI, PCI-E).

DIPLOMA COURSE IN COMPUTER HARDWARE AND NETWORK MAINTENANCE

SEMESTER – I

DCHNM-113: PC MAINTENANCE and TROUBLESHOOTING – I

Time: 3 hours. **M.M: 100**
Credit Hours (per week):4 **Theory Marks: 30**
Total Hours: 60 **Theory Internal Assessment Marks: 10**
Practical Marks: 45
Practical Internal Assessment Marks: 15

Instructions for the Paper Setters: - Medium of Examination is English Language.

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Instructions for Practical Exam: Entire syllabus will be covered for practicals.

Course Objectives:

1.	This course also provides knowledge about internal working and control of computer such as working of Motherboard, Memories, Expansion Bus and peripheral devices especially printers.
2.	This course highlights the tricks and procedures to keep computer system up-to-date (software) and maintained (hardware) in well manner through keeping memories error free.
3.	So, the overall objective of this course is to provide practical exposure for maintaining and repairing the computer in case of faults. It also exposes the ways how to use computer in optimized way to lessen the chance of hardware and memories failures.

SECTION-A

PC Upgrading: Introduction – Upgrade Essentials – Performance Upgrade – Capacity Upgrades – Features Upgrades – Repair Upgrades

BIOS: Typical Motherboard BIOS, BIOS Features, BIOS and Boot Sequences, BIOS Shortcoming and Compatible Issues, BIOS Troubleshooting, BIOS Upgrades.

SECTION-B

Preventive Maintenance: Introduction – Need – Tools – Materials – Procedures – Active Hardware Maintenance – Active Software Maintenance – Passive Maintenance Procedures – Heat and Temperature Control – Dust and Pollution control – Ventilation Control – EMI – Electrostatic Discharge Control – Humidity and Corrosion Control – Shock and Vibration Control – Preventive Maintenance Schedule

SECTION-C

General PC Troubleshooting: Introduction – Types of PC Faults – Solid Faults – Intermittent Faults – Developing Strategy – Diagnostic and Repair Tools – Diagnostic Software Tools –

Diagnostic Hardware Tools – Advanced Testing Tools – Hand Tools for Service Engineers – Disassembling PC

SECTION-D

Hard Disk: Introduction, Disk Basics, Disk Performance and Characteristics, Drive, Construction, Drive Testing and Troubleshooting.

References:

1. Upgrading and Repairing PCs: Muller – Prentice Hall – 10th Edition, 2000.
2. Complete PC Upgrade and Maintenance Guide: Mark Minasi–BPB Publishers 15th Edition, 2004.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	The student become proficient to deal hardware and software related problems of computer systems.
CO-2.	Core level activities and execution of computer processes are highlighted and understood.
CO-3.	Students become able to deal with BIOS and computer memory problems to find right solutions.
CO-4.	Students can also opt higher study based on computer hardware and networking maintenance after understanding the basics of computer through this course.
CO-5.	Students will be able to deal and sort out all day-to- day computer Hardware problem by themselves.

DIPLOMA COURSE IN COMPUTER HARDWARE AND NETWORK MAINTENANCE

SEMESTER – I

DCHNM-114: COMPUTER ASSEMBLING AND INSTALLATION

Time: 3 hours. **M.M: 100**
Credit Hours (per week):4 **Theory Marks: 30**
Total Hours: 60 **Theory Internal Assessment Marks: 10**
Practical Marks: 45
Practical Internal Assessment Marks: 15

Instructions for the Paper Setters: - Medium of Examination is English Language.

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Instructions for Practical Exam: Entire syllabus will be covered for practicals.

Course Objectives:

1.	The course enables the students to understand the fundamentals of PC assembly.
2.	Introduce students to the installation, configuration, optimization and upgrading of computer systems.
3.	Introduce students to troubleshooting and maintaining the computer system.
4.	Provide students with opportunities to develop basic techniques regarding the hardware of a computer system.

SECTION-A

Computer Assembling: Introduction – Overview of Parts of PC – Cabinet – Motherboards – Video Cards – Sound Cards – Modems – Hard Drive – Zip Drive – CD ROM Drive – Network Card – Interfaces – CPU – Main Memory – Power Supply

Setting up the Motherboard: Installing CPU – Setting the Clock Speed – Installing the Memory

Installing Video Card: Testing – Plug in the Video Card – Providing Power to the Motherboard – Testing

SECTION-B

Installing Floppy Drives: Installing Hard Disk Drives – Installing the CD ROM Drive – Installing Key Board and Mouse Installing Sound Card Installing Modem

Installing the Motherboard: Installing the Power Supply – Attaching Add-on cards – Installing the Drives – Testing – Parallel and Serial Port Connection – Front Panel Indicators and Speakers – Troubleshooting

SECTION-C

Operating System Installation

BIOS: Introduction – Features – Developers – Identification – Interrupts – Disk Services – Serial Port Services – Video Services – Printer Screen Services – Flash Memory –BIOS Upgrade – Troubleshooting

CMOS setup: Introduction – Standard CMOS Setup – Advanced CMOS Setup – Advanced Chipset Setup – Power Management Setup – PNP/PCI Setup – Peripheral Setup – Auto Detect IDE Device – CPU Frequency / Voltage Control – CPU PNP Setup – Password Settings – Auto Configuration – Exit Options – BIOS Optimization – Maintenance – Troubleshooting

SECTION-D

Power On Self Test (POST)

Partitioning and Formatting: Introduction – Low Level Formatting – IDE Drives – SCSI Drives – Partitioning - Options – Efficient Partitions – Clusters – FAT 16 – FAT 32 – NTFS – FDISK – Steps for Partitioning – Logical Drives – Primary Partition – Extended Partition – Partitioning Large Drives – Backing up Partition Information – Bad Sectors – Scan Disk – Third Party Partitioning and Formatting Tools – Troubleshooting

Top Level View of Computer Function and Interconnection: Interconnection structure, Bus interconnection.

References:

1. PC Upgrade and Maintenance Guide: Mark Minasi. – BPB Publishers – 15th Edition 2004
2. Computer Fundamentals – P.K. Sinha.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Classify and explain the function of different computer hardware components.
CO-2.	Understand the purpose and functions of an operating system (OS).
CO-3.	Understand the purpose and functions of the computer peripherals (Input/ Output devices).
CO-4.	Understand diagnostic procedures and troubleshooting techniques for personal computers, portable devices, operating systems and computer peripherals.
CO-5.	The student will assemble/set up and upgrade personal computer systems.

DIPLOMA COURSE IN COMPUTER HARDWARE AND NETWORK MAINTENANCE

SEMESTER –II

Sr. No.	Paper Code	Skill Component / General Education	Paper Name	Marks				Page No.
				Theory	Practical	Internal	Total	
1	DCSE-1226	General Education	Communication Skills-II	**30**	**45**	**10Th. 15 Prac.**	**100**	**591-592**
2	DCHNM-121	General Education	Computer Fundamentals-II	**30**	**45**	**10 Th. 15Prac.**	**100**	**593-602**
3	DCHNM-122	Skill Component	Network Operating Systems	**30**	**45**	**10 Th. 15Prac.**	**100**	**603-604**
4	DCHNM-123	Skill Component	PC Maintenance and Troubleshooting – II	**30**	**45**	**10 Th. 15Prac.**	**100**	**605-606**
5	DCHNM-124	Skill Component	Principles of Data Communications and Network Maintenance	**30**	**45**	**10 Th. 15Prac.**	**100**	**607-608**

DIPLOMA COURSE IN COMPUTER HARDWARE AND NETWORK MAINTENANCE

SEMESTER –II
DCSE-1226: COMMUNICATION SKILLS-II
(THEORY)

Time: 3 Hrs. **M.M: 100**
Credit Hours (per week):4 **Theory Marks: 30**
Total Hours: 60 **Theory Internal Assessment Marks: 10**
Practical Marks: 45
Practical Internal Assessment Marks: 15

Instructions for the Paper Setters: - Medium of Examination is English Language.
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Course Objectives:

1.	To develop common understanding between receivers and senders/listeners and speakers.
2.	To support speaker and listener to enhance two way process.
3.	Learn to adjust your communication approach based on need and situation.
4.	Understand barrier to effective communication and how to overcome them.

SECTION A

Reading Skills

1. News paper reading skills
2. Content reading through internet sources
3. Comprehension Passages

SECTION B

Listening Skills

1. Receiving voice calls
2. Attending active phone calls and responding
3. Daily news listening exercises (Audio and Video)
4. Note taking
5. Listening to native speakers conversations.

SECTION C

Common mistakes

1. How to avoid common mistakes in: Nouns, Pronouns, Adjectives, Adverbs, Prepositions, word usage, helping verbs, verbs, phrases, clauses and sentences

Foreign Words

1. Frequently used foreign words.

SECTION D

Advertisement Writing

Classified, Display, Boxed, Billboard, Online

References:

1. KK Ramchandran, et al Business Communication, Macmillan, New Delhi
2. Swati Samantaray, Business Communication and Communicative English, Sultan Chand, New Delhi.
3. S.P. Dhanavel English and Communication Skills for Students of Science and Engineering (with audio CD)
4. Computer Mediated Communication 1st Edition by Crispin Thurlow (Lara Martin Lengel , Alice Tomic.
5. Collins, Patrick. Speak with Power and Confidence. New York: Sterling, 2009.
6. Fitikides, T. J. Common Mistakes in English. London: Orient Longman.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Gain valuable insight by asking open ended questions.
CO-2.	Become a more effective communicator through the use of practical tools.
CO-3.	Learn to use and read body language appropriately.
CO-4.	Learn how to listen more actively and effectively.

(PRACTICAL)

Instructions for Practical Exam: Entire syllabus will be covered for practical.

1. Receiving voice calls
2. Attending active phone calls and responding
3. Daily news listening exercises (Audio and Video)
4. Note taking
5. Listening to native speakers conversations.
6. Advertisements Writing
7. Frequently used foreign words.

DIPLOMA COURSE IN COMPUTER HARDWARE AND NETWORK MAINTENANCE

SEMESTER –II

DCHNM-121: COMPUTER FUNDAMENTALS-II (THEORY)

Time: 3 Hrs. **M.M: 100**
Credit Hours (per week):4 **Theory Marks: 30**
Total Hours: 60 **Theory Internal Assessment Marks: 10**
Practical Marks: 45
Practical Internal Assessment Marks: 15

Instructions for the Paper Setters: - Medium of Examination is English Language.
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Course Objectives:

1.	Bridge the fundamental concepts of computers with the present level of knowledge of the students.
2.	Study the basic taxonomy and terminology of the computer networking and enumerate the layers of OSI model and TCP/IP model.
3.	Understand the types of transmission media with real time applications.
4.	Gain core knowledge of Network layer routing protocols and IP addressing.
5.	Study Tally software and its components.
6.	Implement Inventory Management.

SECTION A

Introduction to networks: Network Definition, Basic Components of a Network, Network types and topologies, Uses of Computer Networks, Network Architecture.
Transmission Media: Coaxial cable, twisted pair cable, fiber optics & satellites. OSI reference model, TCP/IP reference model, comparison of OSI and TCP reference model.
Computer Communication: Basics of Computer networks, LAN, WAN, MAN. Internet: Introduction to internet and its application/services.
Service on Internet: WWW and web-sites, Electronic mails, Communication on Internet.

SECTION B

Web Browsers: Internet Explorer, Chrome and Firefox
Surfing the Internet: Giving the URL address, Search, Moving Around in a web-site, Printing or

saving portion of web pages, down loading/uploading chatting on Internet
Email: Basic of electronic mail, Creating Email id, Mailbox: Inbox and outbox. Using Emails: Viewing an email, sending an Email, saving mails, sending same mail to various users, Document handling: Sending soft copy as attachment, Enclosures to email, sending a Portion of document as email

SECTION C

Tally:
Introduction to financial accounting: accounting concepts.
Financial accounting basics: company creation, accounts configuration, accounts classification, accounts master, creations of voucher, types and classes, accounts vouchers.
Financial accounting advanced: final accounts, bank reconciliation statement.

SECTION D

Inventory: introduction to inventory, stock groups, stock categories, stock item, reorder levels, locations / go downs, units of measure, price list, tariff classification, dealer excise, opening stock, pure inventory voucher, entry of pure inventory voucher, bill of material, purchase and sales order, foreign exchange transactions.
Business management: New Year books, MIS reports, budget management, scenario management.

References:

1. Tanenbaum A. S., "Computer Networks", PHI.
2. TALLY ERP 9 TRAINING GUIDE - 4TH REVISED & UPDATED EDITION – 2018

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Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Using computers at user level, including operative systems and programming environments.
CO-2.	Knowledge of computer equipment, including both hardware and software
CO-3.	Learn about different layers and protocols present in OSI and TCP/IP model
CO-4.	Learn basics of Tally Software.
CO-5.	Learn Inventory Management& MIS.

DIPLOMA COURSE IN COMPUTER HARDWARE AND NETWORK MAINTENANCE

SEMESTER –II

DCHNM-121: Computer Fundamentals-II
(PRACTICAL)

Instructions for Practical Exam: Entire syllabus will be covered for practical.

1. Network types and topologies.
2. Electronic mails.
3. Communication on Internet.
4. Surfing the Internet: Giving the URL address, Search, Moving Around in a web-site, Printing or saving portion of web pages, down loading/uploading
5. Chatting on Internet
6. Introduction to financial accounting: accounting concepts.
7. Financial accounting basics: company creation, accounts configuration, accounts classification, accounts master, creations of voucher, types and classes, accounts vouchers.
8. Financial accounting advanced: final accounts, bank reconciliation statement
9. Inventory: introduction to inventory, stock groups, stock categories, stock item, reorder levels, locations / go downs, units of measure, price list, tariff classification, dealer excise, opening stock, pure inventory voucher, entry of pure inventory voucher, bill of material, purchase and sales order, foreign exchange transactions.
10. Business management: New Year books, MIS reports, budget management, scenario management.

DIPLOMA COURSE IN COMPUTER HARDWARE AND NETWORK MAINTENANCE
SEMESTER –II
DCHNM-122: NETWORK OPERATING SYSTEMS

Time: 3 hours. **M.M: 100**
Credit Hours (per week):4 **Theory Marks: 30**
Total Hours: 60 **Theory Internal Assessment Marks: 10**
Practical Marks: 45
Practical Internal Assessment Marks: 15

Instructions for the Paper Setters: - Medium of Examination is English Language.

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Instructions for Practical Exam: Entire syllabus will be covered for practicals.

Course Objectives:

1.	To understand different types of networks, various topologies and application of networks.
2.	Identification and comparison of the major network operating system include window NT, window 9X and window XP.
3.	Installation and configuration of window 2003 server.
4.	To provide Knowledge of Remote Administration.

SECTION-A

Introduction of various Network Operating Systems (Windows 9x/XP/2000/NT)
Introduction to Windows 2003 server, Window 2003 features, Hardware requirements, Planning the network, Windows 2003 network security model, Special purpose servers, Licensing.

SECTION-B

Planning storage strategies, Options, Working with disk administrator and backup.

SECTION-C

Networking and Network protocols, Configuration of Windows 2003, Windows 2003 services, Architecture and security Architecture, Planning and managing group and user accounts.

SECTION-D

File services, Distributed file system, Remote administration, Remote access services, Internet and Intranet. Printing and supporting network clients, Performance tuning.

References:

1. Windows NT 4 The Complete Reference by Sybex Publisher: BPB 1999. 2. Inside Windows Server 2003: William Boswell Publisher: Pearson 2003.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Knowledge about how to install and configure window 2003 server.
CO-2.	The students will become proficient to deal with the sharing of resources and memory amongst the autonomous computers in the network.
CO-3.	Familiarity with the interfacing of printers and installing driver software.
CO-4.	Students will also be able to work with planning and managing user and groups account.
CO-5.	Learning about how to access computer remotely.

DIPLOMA COURSE IN COMPUTER HARDWARE AND NETWORK MAINTENANCE

SEMESTER –II

DCHNM-123: PC MAINTENANCE and TROUBLESHOOTING – II

Time: 3 Hours **M.M: 100**
Credit Hours (per week):4 **Theory Marks: 30**
Total Hours: 60 **Theory Internal Assessment Marks: 10**
Practical Marks: 45
Practical Internal Assessment Marks: 15

Instructions for the Paper Setters: - Medium of Examination is English Language.
Note: Eight questions are to be set by selecting two questions from each section. Each question is divided in subsections (not exceeding 4). The candidates are required to attempt five questions by selecting one question from each section and the fifth question can be attempted from any section. All questions carry equal marks.
Instructions for Practical Exam: Entire syllabus will be covered for practicals.

Course Objectives:

1.	This course provides knowledge about internal working and control of computer such as working of Motherboard, Memories and peripheral devices especially printers.
2.	This course highlights the tricks and procedures to keep computer system up-to-date (software) and maintained (hardware) in well manner through keeping memories error free.
3.	So, the overall objective of this course is to provide practical exposure for maintaining and repairing the computer in case of faults. It also exposes the ways how to use computer in optimized way to lessen the chance of hardware and memories failures.

SECTION-A

Motherboard and Buses: Introduction, Motherboard Components, Expansion Slots system Bus Functions and Features. Upgrading and Troubleshooting Motherboard, General Bus Troubleshooting.

SECTION-B

Basic Memory Concepts: Introduction, Installing Memories, Upgrade Options and Strategies, Replacing Memories with Higher Capacity. Troubleshooting Memory.

SECTION-C

Printers: Printer Technology, How Printer Works, Attaching Printer, Installing Printer Drivers, Preventive Maintenance, Common Printer Problems and Solution

SECTION-D

Error Code: Beep Code, Post Code, Post Reader Card.

References:

1. **Upgrading and Repairing PCs: Muller – Prentice Hall – 10th Edition, 2000.**
2. **Complete PC Upgrade and Maintenance Guide: Mark Minasi–BPB Publishers 15th Edition, 2004.**

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	The student become proficient to deal hardware and software related problems of computer systems.
CO-2.	Core level activities such as BIOS management, Booting and execution of computer processes are highlighted and understood through practical demonstration.
CO-3.	Students become able to deal with hard disk and printer problems to find right solutions.
CO-4.	After completing this course, student can get pBooks Prescribed in computer hardware and maintenance jobs.
CO-5.	Students can also pursue higher study based on computer hardware and networking maintenance after understanding the basics of computer through this course.

DIPLOMA COURSE IN COMPUTER HARDWARE AND NETWORK MAINTENANCE
SEMESTER –II

DCHNM-124: PRINCIPLES OF DATA COMMUNICATION and NETWORK MAINTENANCE

Time: 3 hours. **M.M: 100**
Credit Hours (per week):4 **Theory Marks: 30**
Total Hours: 60 **Theory Internal Assessment Marks: 10**
Practical Marks: 45
Practical Internal Assessment Marks: 15

Instructions for the Paper Setters: - Medium of Examination is English Language.
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Instructions for Practical Exam: Entire syllabus will be covered for practicals.

Course Objective:

1.	Understand different types of networks, various topologies and applications of networks.
2.	Understand types of addresses and data communication.
3.	Understand the concept of each layer's networking models, protocols, and functionality.
4.	Learn basic networking hardware and tools.

SECTION-A

Modems: Introduction – Serial Communication – RS 232 – Flow Control – Cables – Analog Modems – Speed – Standards – Maintenance – Digital Technology – ISDN Services – Broad Band – Narrow Band – DSL – Wireless Connections – Port Problems – Modem Problems – Cable fault
Network: LAN – MAN – WAN – Components – Protocol – API – Setting up the Network – Installing Cables – Wireless Network – Installing and Configuring Network Cards – Hubs switches – Internetworking – Intranet working – Repeaters – Routers – Networking security – Passwords – Firewall

SECTION-B

Local Area Network Protocols: CSMA Protocols, BRAP, MLMA, IEEE standards 802, Token Bus, Token Ring, FDDI.
IEEE Standards: 802 – 802.3 – 802.4 – 802.5 – 802.6 Case studies: NT/2000, NETWARE and LINUX

SECTION-C

Network Maintenance: Introduction to Computer Networks -Network Topology-LAN Technologies-Ethernet Standards-Network Troubleshooting Tools-Network Components-WAN Technologies-High-Speed Wan Media-Network Media (Cabling)-Media Access Methods-The OSI reference model-TCP/IP Suite-TCP/IP Utilities-Network Services-Remote Access and Security Protocols-Network Operating System (NOS)-Fault Tolerances-Internet-Network Support.

SECTION-D

Introduction to Analog and Digital Transmission: Telephone system, Modems, Types of modems, pulse code modulation. Transmission and Switching: Multiplexing, circuit switching, packet switching, hybrid switching, ISDN service transmission.

References:

1. Behrouz A Forouzan: Data Communications and Networking, McGraw Hill, 2006, 4th Edition.
2. Stallings, William: Local Networks: An Introduction: Macmillan Publishing Co., Stallings.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	A hands-on approach will provide the student with a basic skill level to work on a computer with the lid off.
CO-2.	Designing of the homogenous and heterogeneous lab.
CO-3.	Creating Windows 95/NT/Novell Netware Server.
CO-4.	How to share information from One PC or clients to other clients or PC.
CO-5.	Learning with various network technologies, telephone systems, modulation and demodulation, APIs and network models.

SYLLABUS FOR THE BATCH FROM THE YEAR 2022 TO YEAR 2023

Programme Code: PDCA

Programme Name: P.G. DIPLOMA IN COMPUTER APPLICATIONS

(Semester I-II)

Examinations: 2022-2023

P.G. Department of Computer Science & Applications

Khalsa College, Amritsar

Programme name: P.G. DIPLOMA IN COMPUTER APPLICATIONS
Programme code: PDCA
Programme Duration :1 year

Programme Objectives:

1.	Give students an in-depth understanding of why computers are essential components in business, education and society.
2.	An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution.
3.	An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.
4.	An ability to function effectively on teams to accomplish a common goal.
5.	An understanding of professional, ethical, legal, security and social issues and responsibilities.

Programme Specific Outcomes (PSOs):

PSO-1.	To understand and comprehend advanced level of programming, databases, networks concept and management, Web Designing & Uses of Internet and data analysis.
PSO-2.	To demonstrate competence in using computer science concepts and computational tools for simulation and digital transformation.
PSO-3.	To develop ability to effectively apply the information technology concepts to analyze, design and develop cost effective solutions to the societal problems.
PSO-4.	To provide user friendly and need based mobile, web or cloud based solutions to the society.
PSO-5.	To understand and comprehend advanced level of programming, databases, networks concept and management, Web Designing & Uses of Internet and data analysis.

P.G. DIPLOMA IN COMPUTER APPLICATIONS

SEMESTER – I

Sr. No.	Paper	Paper Name	Marks				Page No.
			Theory	Practical	Internal	Total	
1	PDCA-411	PC Computing-I (MS Office) 2010	**37**	**37**	**13Th. 13 Prac.**	**100**	**612-613**
2	PDCA-412	PC Computing-II (Professional DTP)	**37**	**37**	**13 Th. 13 Prac.**	**100**	**614-616**
3	PDCA-413	Fundamentals of Computer & Operating Systems	**37**	**37**	**13 Th. 13 Prac.**	**100**	**617-618**
4	PDCA-414	Database Management System through Oracle-10g & System Analysis & Design	**37**	**37**	**13 Th. 13 Prac.**	**100**	**619-620**

P.G. DIPLOMA IN COMPUTER APLLICATIONS
SEMESTER – I
PDCA-411: PC COMPUTING-I (MS Office) 2010

Time: 3 Hrs. . **M.M: 100**
Credit Hours (per week):4 **Theory Marks: 37**
Total Hours: 60 **Theory Internal Assessment Marks: 13**
Practical Marks: 37
Practical Internal Assessment Marks: 13

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **1.5 marks** with answer to each question up to 10 lines in length. The total weightage being **09 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from UNIT-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **07 marks.** The total weightage of this section shall be **14 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from UNIT-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **07 marks.** The total weightage of this section shall be **14 marks**.
Course Objectives:

Enable the student to

1.	To be proficient in office automation applications.
2.	Handle the word processing software.
3.	To create reports using MS Access.
4.	Understand that in In Today's commercial world, automation helps the users with a sophisticated set of commands to format, edit, and print text documents.
5.	Use it as valuable and important tools in the creation of applications such as newsletters, brochures, charts, presentation, documents, drawings and graphic images.

UNIT I

MS-Word: Introduction to MS-Office, MS-Access, MS Excel. Parts of window of word (Title bar, menu bar, status bar, ruler) , Creation of new documents, opening document ,insert a document into another document. Page setup, margins, gutters, font properties, Alignment, page breaks, header footer deleting ,moving, replace, editing text in document. Saving a document, spell

checker, printing a document. Creating a table, entering and editing, Text in tables. Changing format of table, height width of row or column. Editing, deleting Rows, columns in table. Borders, shading, Templates, wizards, Drawing objects, mail merge

MS-Power Point: Introduction to Ms power point. Power point elements (templates wizard Views, color schemes ,Exploring power point menu (opening & closing menus, working With dialogues boxes), adding text, adding title, moving text area, resizing text Boxes, adding pictures. Starting a new slide, saving presentation, printing slides .Views (slide View slide sorter, notes view, outline view) .Formatting & enhancing text formatting, Choosing transitions. Creating a graph, displaying slide show, adding multimedia .Slide transitions. Timing slide display, adding movies & sounds. Using a pick look Wizards to change format.

UNIT II

MS-Excel: Introduction to Worksheet/Spreads, Features of excel. Describe the excel Window, different functions on different data in excel, creation of graphs, editing it and formatting, changing chart type to 2d chart or 3d chart, creation of worksheet, adding, deleting, moving the text in worksheet, linking different sheets, sorting the data, querying the data, filtering the data (auto and advance filters), What-if analysis, printing a worksheet.

MS-Access: Introduction, Understanding Databases. Creating the tables. entering records in table, deleting table, modifying table fields, linking tables, Queries. Forms, formatting forms, relating a form to tables, Reports(building reports, formatting report. displaying the information of table using reports Adding Graphs to your reports. .

References:

1. PC Computing by R.K. Taxali.
2. PC Software by Rachpal Singh & Gurinder Singh**.**

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Use word processors, spreadsheets and presentation software.
CO-2.	Understand and create a database using MS Access.
CO-3.	Describe the features and functions of the categories of application software.
CO-4.	Understand the dynamics of an office environment.
CO-5.	Demonstrate the ability to apply application software in an office environment.

P.G. DIPLOMA IN COMPUTER APLLICATIONS
SEMESTER – I

PDCA-412: PC COMPUTING–II (Professional DTP)

Time: 3 Hrs
Credit Hours(per week):4 **M.M: 100**
Total Hours: 60 **Theory Marks: 37**
Theory Internal Assessment Marks: 13
Practical Marks: 37
Practical Internal Assessment Marks: 13

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **1.5 marks** with answer to each question up to 10 lines in length. The total weightage being **09 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from UNIT-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **07 marks.** The total weightage of this section shall be **14 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from UNIT-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **07 marks.** The total weightage of this section shall be **14 marks**.
Course Objectives:

1. Corel Draw and Photoshop are graphics-based applications widely used for logo designing, brochures, pamphlets, product box packs, designing a visiting card, and for various advertisements and editing jpeg and other image formats related to graphic designing.
2. They are much admired owing to their usability.
3. The course is in high demand for those who wish to make their career as Graphics designers.
4. As the Demand for Graphics is increasing day by day in media, print, web etc., there are more prospects for jobs and self-employment. There is a constant demand for creative designers in the domestic industry as we as an industry abroad.

UNIT I

Photoshop 5.5

1. Introduction to Graphics, Vector Graphics & Bitmaps
2. Understanding Image Size & resolution
3. Relation between resolution, File sizes & output
4. Using menu & Palettes.
5. Concept of Path (Segment, Anchor, Curved, Closed, Open, Subpath)

Photoshop 5.5

1. Photoshop Tools (Pen, Pencil, Brush, History, Air, Eraser, Rubber stamp, Smudge, Dodge, Burn, Sponge), Masks & Histogram.
2. Acquiring &. Importing Images,
3. Concept of Layer Channels & Path, Filters, Rendering Effects, Transformation, Strokes, Image Modes, Canvas & Images.
4. Using navigator & Photoshop plugins.

UNIT-II

Corel Draw-9

1. Concepts of vector graphics.
2. Color palate, Pasteboard, &. Print Page

Corel Draw-9

1. Using ruler unit's etc...
2. Corel Tools (Pick, Shape, Knife, Eraser, Zoom, Freehand, Natural Pen, Dimensions, Ellipse, Polygon etc.).
3. Transformations, Trimming, Wielding, Intersection of Objects, Snapping, Using Object Manager.
4. Giving effects, (Envelope, Adding Perspective, Contours, Blending Image.)

References:

1. CorelDraw 10 for Windows by Phyllis Davis and Steve Schwartz.
2. Adobe Photoshop for Beginners 2021: Learn The Amazing Features Of Photoshop By Hector Grant.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Get essential information on CorelDraw Graphics Suite.
CO-2.	Become comfortable with the CorelDraw work area, tools, boards, and fundamental methods and understand the strategies of making and controlling vector (plan) articles, shapes and variety fill.
CO-3.	Work with imaginative text for the making logos, marks and any other one-page print plan material.
CO-4.	Work on Corel Draw, Vector Graphics, Colour Palette and Pasteboard.
CO-5.	Get essential information on CorelDraw Graphics Suite.

P.G. DIPLOMA IN COMPUTER APLLICATIONS
SEMESTER – I
PDCA-413: FUNDAMENTALS OF COMPUTER & OPERATING SYSTEMS

Time: 3 Hrs. **M.M: 100**
Credit Hours(per week):4 **Theory Marks: 37**
Total Hours: 60 **Theory Internal Assessment Marks: 13**
Practical Marks: 37
Practical Internal Assessment Marks: 13

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **1.5 marks** with answer to each question up to 10 lines in length. The total weightage being **09 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from UNIT-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **07 marks.** The total weightage of this section shall be **14 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from UNIT-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **07 marks.** The total weightage of this section shall be **14 marks**.

Course Objectives:

1.	To discuss about computers, components of computer and their applications.
2.	To understand basics of Disk operating system and its various commands.
3.	Explanation of fundamental concepts of computer hardware and software.

UNIT I

Fundamentals of Computer:
Introduction to computer, Applications of computer, Components of computers, Input-output devices (key boards, mouse, track ball, light pen, cards, printers, plotters, scanners), Secondary storage devices (floppy disk, magnetic disk, Winches er disk, optical disk) Types of software, Translators (compiler, interpreter, assembler), Introduction to data communication and network.

Introduction to Windows Vista:
Parts of window screen (Desktop, window, icons), start menu, Taskbar settings, application & document window, anatomy of a window (Title bar, minimize, maximize button, control box, scroll bars, scroll buttons, scroll boxes), Window explorer (expansion, collapsing of directory tree,

copying, moving, deleting files, folder, creating folders), About desktop icons (recycle bin, my computer, network neighborhood, briefcase), folder, shortcut creation, setting of screen saver, color settings, wallpaper, changing window appearance.

UNIT II

Disk Operating System:

Meaning of operating system, its functions, batch systems, real systems, multi programming, multitasking, single, multi user systems. Define dos, Structure of Ms-Dos (description of booting files, steps to boot the system), hot & cold booting internal command (cls, dir, date, time, vol, ver, copy con, type, ren, del, md, rd, d, path, prompt), external commands edit, attrib, backup, restore, chkdsk, diskcopy, dskcomp, deltree, edit, format.

Introduction to Unix:

Explain the features of Unix system. Structure of Unix (Kernel, shell), Unix file system (data blocks, list, superblock, bootblock), Types of files (ordinary files, directory, special files), types of users (0-2), simple commands (cat, Is, In, chmod, mail, who, who am I, cal pwd, date, ps, mkdir, cd , rmdir, rm , tput, clear). Piping, filters, batch processing, shell programming
(Echo, read, case constructs). VI editor (opening it, inserting, modifying, deleting, saving files). Types of shells (bourne, c, r shell. Login & logout of unix session).

References:

1. PC Software: By Rachpal Singh & Gurinder Singh.
2.Computer Fundamental: By Peter Norton.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Get knowledge about the usage of computers and their importance as essential components in business, education and society.
CO-2.	Understand the concept of peripheral devices and memory.
CO-3.	Get introduced to the basic concepts of Operating System, its functions and services.
CO-4.	Understand various features and application of window vista.
CO-5.	Learn about the fundamentals of UNIX operating system and its various commands.

P.G. DIPLOMA IN COMPUTER APLLICATIONS
SEMESTER – I
PDCA-414: DATABASE MANAGEMENT SYSTEM THROUGH ORACLE-10g & SYSTEM ANALYSIS & DESIGN

Time: 3 Hrs. **M.M: 100**
Credit Hours(per week):4 **Theory Marks: 37**
Total Hours: 60 **Theory Internal Assessment Marks: 13**
Practical Marks: 37
Practical Internal Assessment Marks: 13

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **1.5 marks** with answer to each question up to 10 lines in length. The total weightage being **09 marks**.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from UNIT-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **07 marks.** The total weightage of this section shall be **14 marks.**

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from UNIT-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **07 marks.** The total weightage of this section shall be **14 marks**.

Course Objectives:

1.	To evolve an understanding of vital DBMS concepts such as database security, integrity.
2.	To learn the physical and logical database designs, database modeling, relational, hierarchical, and network models
3.	To describe DBMS Architecture & Data Independence.
4.	To learn the different cases involved in the design and implementation of a database system.

UNIT I

Basic Concepts:

An overview of Database Management, (database, database system, why database, data independence). An architecture for a database system (levels of the architecture, mapping, DBA), Introduction to Relational database systems.

Relational Model:

Domain and relations, Relational data integrity

System Analysis and Design:

System development life cycle, System development tools.

UNIT II

ORACLE 10g:

SQI. *PLUS

Introduction to Oracle 10g SQL- DOL, DML, DCL
Join methods & Sub query, Union, Intersection, Minus, Tree Walking
Built in Functions, Views, Security amongst users, Sequences, Indexing, Object Oriented

Features of Oracle 10g

PL/SQL:

Introduction to PL/SQL Cursors- Implicit & Explicit Procedures, Functions & Packages
Database Triggers

References:

1. Database Systems Concepts by Silberschatz, Korth & Sudarshan
2. An Introduction of Database System by C.J. Date (Addison-Wesley Publishing co.)
3. SQL/PL/SQL. The Programming Language of Oracle by Ivan Bayross (BPB Publications)

Course Outcomes:

The students, after the completion of the course, are expected to:

CO-1.	Illustrate the basic elements of a relational database management system
CO-2.	Develop skill to solve the data models for applicable problems
CO-3.	Develop ability to convert ER diagrams into RDBMS data.
CO-4.	Make database connectivity in programming language

P.G. DIPLOMA IN COMPUTER APLLICATIONS

Semester- II

Sr. No.	Paper	Paper Name	Marks				Page No.
			Theory	Practical	Internal	Total	
1	PDCA-421	Network Concepts and Management (Hardware, Software, setting in LINUX/UNIX/NT environment	**37**	**37**	**13Th. 13 Prac.**	**100**	**622-623**
2	PDCA-422	Programming in C	**37**	**37**	**13 Th. 13 Prac.**	**100**	**624-626**
3	PDCA-423	Introduction to Scripting Languages, Web Designing & Uses of Internet	**37**	**37**	**13 Th. 13 Prac.**	**100**	**627-628**
4	PDCA-424	Programming in Visual Basic with Active X	**37**	**37**	**13 Th. 13 Prac.**	**100**	**629-630**

P.G. DIPLOMA IN COMPUTER APLLICATIONS
SEMESTER – II
PDCA-421: NETWORK CONCEPTS AND MANAGEMENT
(HARDWARE, SOFTWARE, SETTING IN LINUX/UNIX/NT ENVIRONMENT)

Time: 3 Hrs. **M.M: 100**
Credit Hours(per week):4 **Theory Marks: 37**
Total Hours: 60 **Theory Internal Assessment Marks: 13**
Practical Marks: 37
Practical Internal Assessment Marks: 13

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **1.5 marks** with answer to each question up to 10 lines in length. The total weightage will carry **09 marks**.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from UNIT-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **07 marks.** The total weightage of this section shall be **14 marks.**

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from UNIT-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **07 marks.** The total weightage of this section shall be **14 marks**.

Course Objectives:

1.	Understand that global connectivity can be achieved through computer networks.
2.	Understand the function of networks and get exposure to different existing and upcoming communication technologies.
3.	Make them aware that knowledge about hardware and software requirements of networks is essential.

UNIT I

Introduction:

Network H/W and Software requirement~ Network topologies, OSI reference model, TCP/IP model.

Design Issues: ISDN, ATM, Routers, hub, switches.

Network security:

Data compression techniques, cryptography, IP addressing schemes.

UNIT II

NT administration:

Account policies, creating a user account, group membership, administration of share through server manager. Primary Domain controller, backup, domain controller.

Unix:

Network Operating System: Architecture, Shell, Kernel & File System

Introduction to Linux:

Comparative study of NT server, Unix and Linux.

References:

1. Tannenbaum: Computer Network, Prentice Hall, 1992, 3rd.
2. Robert Reinstein, et.al: Windows NT Trouble Shooting and Configuration, Techmedia.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Become familiar with the concept of Network hardware and software requirements.
CO-2.	Understand the working of different protocols at different layers of OSI and TCP/IP models.
CO-3.	Learn the concepts of different networking devices like router, hub, and switch.
CO-4.	Understand the concept of IP address and its various classes.
CO-5.	Compare and understand the different networking operating systems like Windows NT, UNIX and Linux.

P.G. DIPLOMA IN COMPUTER APLLICATIONS
SEMESTER – II
PDCA-422: PROGRAMMING IN C

Time: 3 Hrs. **M.M: 100**
Credit Hours(per week):4 **Theory Marks: 37**
Total Hours: 60 **Theory Internal Assessment Marks: 13**
Practical Marks: 37
Practical Internal Assessment Marks: 13

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **1.5 marks** with answer to each question up to 10 lines in length. The total weightage being **09 marks**.
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Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from UNIT-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **07 marks.**The total weightage of this section shall be **14 marks**.
Course Objectives:

1.	To comprehend how C works. To become familiar with the grammar and semantics of the C programming language.
2.	To figure out how to plan C classes for code reuse.
3.	To figure out how to carry out duplicate constructors and class part works. To give complete information on C language. Understudies will figure out how to configure programs essentially.

UNIT I

Fundamentals of C:

Introduction of C, Data Types, Operators, their precedence, expressions and their evaluation.

Input / Output Functions:

Formatted I/O, Character I/O & String I/O Functions.

Control Structures:

Taking decisions using if, if-else, switch constructs and Conditional Operator, Description of break and continue Statements. Performing loops using for, while, do-while Constructs.

Functions:

Library Functions vs User-Defined Functions, Declaring (Prototyping) and defining User-Defined functions, ways of passing parameters to functions, Recursive functions, Storage Classes.

UNIT II

Arrays & String:

What are Arrays, Declaring arrays, initializing arrays, processing of arrays, passing arrays arguments to functions. What are Strings? How strings are handled in C? String functions, arrays of string.

Pointers:

What is a pointer variable? Declaring pointers, accessing values via pointers, pointer arithmetic, pointer to strings, passing arguments using pointers.

Structure and Unions.

Defining a structure type, declaring variables of structure type, initializing structures. Accessing Structure Elements, Use of assignment Statement for structures, array of structures, nested structures, Unions; Declaring a Union, Accessing elements of a type union.

Managing Data Files:

Processing a file, Standard Input/Output, System Level I/O, File updating

References:

1. Yashwant Kanetkar: Let us C, BPB Publications, New Delhi.
2. R.S.Salaria : Application Programming in C, Khanna Book Publishing Co.(P) Ltd., Delhi.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Figure out the basics of C programming.
CO-2.	Get information on programming which will assist them with making programs and applications in C.
CO-3.	Learn the essential programming builds, which can undoubtedly help them in switching over to any other language in future.
CO-4.	Develop basic understanding of computers, the concept of algorithms and algorithmic thinking.
CO-5.	Develop the ability to analyse a problem and develop an algorithm to solve it.

P.G. DIPLOMA IN COMPUTER APLLICATIONS
SEMESTER – II
PDCA-423: INTRODUCTION TO SCRIPTING LANGUAGES
WEB DESIGNING AND USES OF INTERNET

Time: 3 Hrs. **M.M: 100**
Credit Hours(per week):4 **Theory Marks: 37**
Total Hours: 60 **Theory Internal Assessment Marks: 13**
Practical Marks: 37
Practical Internal Assessment Marks: 13

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **1.5 marks** with answer to each question up to 10 lines in length. The total weightage being **09 marks**.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from UNIT-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **07 marks.** The total weightage of this section shall be **14 marks.**

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from UNIT-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **07 marks.** The total weightage of this section shall be **14 marks**.

Couse Objectives:

1.	To create better understanding of the principles of creating an effective web page and learning of the web language: HTML
2.	Better acquaintance with graphic design principles and learn how to implement these theories into reality.
3.	Better learning of how to plan and conduct user research related to web designing.
4.	Students learn various techniques of Web design, Form Design, Table Design, Front page 2000 and learn how to embed social media content into web pages.
5.	Skills are developed to analyses social sites.

UNIT I

HTML

Structure of HTML, Tags, Character Entities, Hyperlinks, Frames, Tables, Lists, Forms, Limitations of HTML.

Front Page 2000

Features, Creating a Web Site using Wizard, One / Two / Three Column Body, Front Page Window, Various Toolbars of Front Page, Adding Clip Art, Thumbnails, resampling an Image, Beveling & Cropping an Image, Creating Bookmarks, Adding an E-mail Hyperlink, Tables, Marquee, Counter, banner, Hover Buttons, Creating a Web Page Using a Template, Themes, Forms.

UNIT II

Internet & its Use

Types of Internet Connectivity, World Wide Web, E-mail, Telnet, Filer Transfer Protocol, IRC, Virtual Reality, Web Publishing, Web Hosting, Cyber Crime, Types of Cyber Crimes, Cookies, Virus, Trojan Horse, Worm, Danger of Virus.

References:

1. Internet Applications and Web Designing by A.P. Publishers.
2. HTML, DHTML, Java Script, Perl, CGI by BPB Publications.
3. Learning to Use Internet by BPB Publications.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Understand the HTML tags.
CO-2.	Learn how to write, test and debug web pages using HTML
CO-3.	Become familiar with graphics.
CO-4.	Develop ability to create and edit web pages using Front Page.
CO-5.	Understand different types of internet connectivity and protocols related to internet

P.G. DIPLOMA IN COMPUTER APLLICATIONS

SEMESTER – II

PDCA-424: (Option-i): PROGRAMMING IN VISUAL BASIC with ACTIVE–X

Time: 3 Hrs. **M.M: 100**

Credit Hours(per week):4 **Theory Marks: 37**

Total Hours: 60 **Theory Internal Assessment Marks: 13**

Practical Marks: 37

Practical Internal Assessment Marks: 13

Note: 1. Medium of Examination is English Language.

2. The question paper covering the entire course shall be divided into three sections.

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **1.5 marks** with answer to each question up to 10 lines in length. The total weightage being **09 marks**.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from UNIT-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **07 marks.** The total weightage of this section shall be **14 marks.**

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from UNIT-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **07 marks.** The total weightage of this section shall be **14 marks**.

Course Objectives:

1.	Analyze program requirements.
2.	Design/develop programs with GUI interfaces.
3.	Code programs and develop interface using Visual Basic.Net.
4.	Perform tests, resolve defects, and revise existing code.

UNIT I

Introduction to VB Environment
VB Applications
Controls Menus, Tool Bar and Dialogue Boxes
Testing and Debugging
Working with Files
Data Access Objects (DAO)

UNIT II

Remote Data Objects (RDO)
Active X Data Objects (ADO)
Data Reports
OLE -Control & Automation Server

Active X -CONTROLS, EXE, DLL, Document, Wizards
Minor Project

References:

1. Visual Basic in easy steps by McGraw Hill.
2. Visual Basic 6 Programming Black Book by Steven Holzner**.**

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Design, formulate, and construct applications with visual basic
CO-2.	Understand the integrated development environment (IDE)
CO-3.	Distinguish between the types of event driven programming.
CO-4.	Write program code using event driven programming

SYLLABUS FOR THE BATCH FROM THE YEAR 2022 TO YEAR 2023

Programme Code: PDDS

Programme Name: P.G. DIPLOMA IN DATA SCIENCES

(Semester I-II)

Examinations: 2022-2023

P.G. Department of Computer Science & Applications

Khalsa College, Amritsar

Programme name: P.G. DIPLOMA IN DATA SCIENCES
Programme code: PDDS
Programme Duration :1 year

Programme Objectives:

1.	Develop a broad academic and practical literacy in computer science, statistics, and optimization, with relevance in data science so that students are able to critically select and apply appropriate methods and techniques to extract relevant and important information from data.
2.	Provide strong core training so that graduates can adapt easily to changes and new demands from industry.
3.	Enable students to understand not only how to apply certain methods, but when and why they are appropriate.
4.	Integrate fields within computer science, optimization, and statistics to create adept and well-rounded data scientists.
5.	Expose students to real-world problems in the classroom and through experiential learning.

Program Specific Outcomes (PSOs)

PSO-1.	To become a skilled Data Scientist in industry, academia, or government.
PSO-2.	To use specialist software tools for data storage, analysis and visualization.
PSO-3.	Students will demonstrate proficiency with statistical analysis of data.
PSO-4.	Students will be able to obtain, clean/process, and transform data.
PSO-5.	Formulate and use appropriate models of data analysis

P.G. DIPLOMA IN DATA SCIENCES

SEMESTER – I

Sr. No.	Paper	Paper Name	Theory	Internal	Practical	Total	Page no.
1	PDDS-411	Introduction to Python	**75**	**25**	**-**	**100**	**634-635**
2	PDDS-412	Introduction to AI and Data Science	**75**	**25**	**-**	**100**	**636-638**
3	PDDS-413	Big Data Analytics	**75**	**25**	**-**	**100**	**639-640**
4	PDDS-414P	Programming Laboratory (Based on Python)	**-**	**13**	**37**	**50**	**641**
5	PDDS-415P	Programming Laboratory(Based on AI and Data Science)	**-**	**13**	**37**	**50**	**642**

P.G. DIPLOMA IN DATA SCIENCES
SEMESTER – I
PDDS-411: Introduction to Python

Time: 3 Hours **Max. Marks: 100**
Credit Hours (per week):4 **Theory Marks:75**
Total Hours: 60 **Theory Internal Assessment Marks:25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from UNIT-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from UNIT-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.
Course Objectives:

1.	Demonstrate the ability to solve problems using system approaches, critical and innovative thinking, and technology to create solutions.
2.	Understand the purpose and technology to create solutions.
3.	Create scripts in Python.
4.	Design and develop applications using Python.

UNIT-I

Introduction to Python: Process of Computational Problem Solving, Python Programming Language
Data and Expressions: Literals, Variables and Identifiers, Operators, Expressions, Statements and Data Types
Control Structures: Boolean Expressions (Conditions), Logical Operators, Selection Control, Nested conditions, Debugging

Lists: List Structures, Lists (Sequences) in Python, Iterating Over Lists (Sequences) in Python
Functions: Fundamental Concepts, Program Routines, Flow of Execution, Parameters & Arguments
Iteration: While statement, Definite loops using For, Loop Patterns, Recursive Functions, Recursive Problem Solving, Iteration vs. Recursion

UNIT-II

Dictionaries: Dictionaries and Files, Looping and dictionaries, Advanced text parsing
Files: Opening Files, Using Text Files, String Processing, Exception Handling
Objects and Their Use: Introduction to Object Oriented Programming
Modular Design: Modules, Top-Down Design, Python Modules
Using Databases and SQL: Database Concepts, SQLite Manager Firefox Add-on, SQL basic summary, Basic Data modeling, Programming with multiple tables

References:

1. Python for Informatics, Charles Severance, version 0.0.7
2. Introduction to Computer Science Using Python: A Computational Problem-Solving Focus, Charles Dierbach, Wiley Publications, 2012, ISBN : 978-0-470-91204-1
3. Introduction To Computation And Programming Using Python, GUTTAG JOHN V, PHI, 2014, ISBN-13: 978-8120348660
4. Introduction to Computating& Problem Solving Through Python, Jeeva Jose and Sojan P. Lal,Khanna Publishers, 2015, ISBN-13: 978-9382609810
5. Introduction to Computing and Programming in Python, Mark J. Guzdial, Pearson Education, 2015, ISBN-13: 978-9332556591
6. Fundamentals of Python by Kenneth Lambert, Course Technology, Cengage Learning , 2015
7. Learning Python by Mark Lutz, 5th Edition, O'Reilly Media, 2013.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Describe the core syntax and semantics of Python programming language.
CO-2.	Discover the need for working with the strings and functions.
CO-3.	Illustrate the process of structuring the data using lists and dictionaries.
CO-4.	Infer the Object-oriented Programming concepts in Python.
CO-5.	Develop the ability to write database applications in Python.

P.G. DIPLOMA IN DATA SCIENCES
SEMESTER – I
PDDS-412: Introduction to Artificial Intelligence and Data Science

Time: 3 Hours **Max. Marks: 100**
Credit Hours (per week):4 **Theory Marks:75**
Total Hours: 60 **Theory Internal Assessment Marks:25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from UNIT-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from UNIT-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.

Course Objectives:

At the end of the course, the students will be able to:

1.	Understand working of computers to perform such intellectual tasks as decision-making, problem solving, perception, understanding human communication.
2.	Understand how machine learn from examples.
3.	Understand the concept of data representation and transformation of data.
4.	Analyze, design, test and implement the model required for various applications
5.	Understand how data visualization and presentation is achieved using Charts-histograms, scatter plots, time series plots and Graphs.

UNIT-I

Introduction to Artificial Intelligence: Definitions of AI, Intelligent Agents, Problem solving.
Knowledge, Reasoning and Planning: Logical Agents, Classical Planning, Knowledge Representation and Reasoning.
Learning: Learning from examples, Knowledge in learning.
Communicating, Perceiving and Acting:
Communication, Natural Language Processing, Perception, Robotics.

UNIT-II

Introduction to Data Science: Data Science-a discipline, Landscape-Data to Data science, Data Growth-issues and challenges, data science process. foundations of data science.
Data Exploration and Preparation: Messy data, Anomalies and artifacts in datasets. Cleaning data.
Data Representation and Transformation: Forms of data-tabular, text data, graph-based data. Modern databases- text files, spreadsheets, SQL databases, NoSQL databases, distributed databases, live data streams. Representation of data of special types-acoustic, image, sensor and network data.
Computing with Data: Overview of R, Python and Julia.
Data Modeling: Basics of Generative modeling and Predictive modeling.
Data Visualization and Presentation: Charts-histograms, scatter plots, time series plots etc. Graphs, 3D Visualization and Presentation

References:

1.S.J. Russell and P.Norving: “Artificial Intelligence: A Modern Approach”, Pearson.
2. Sinan Ozdemir, “Principles of Data Science”, Packt Publishing.
3.E.Rich, K.Knight, S.B. Nair: “Artificial Intelligence”, Tata McGraw Hill Ed Pvt Ltd.
4.Joel Grus: “Data Science from Scratch”, O’Reilly.
5.Foster Provost & Tom Fawcett: “Data Science for Business” O’Reilly
6. Roger D. Peng & Elizabeth Matsui: “The Art of Data Science” Lean Publishing.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Implement the principles of artificial intelligence and data science that require problem solving, inference, perception, knowledge representation, and learning.
CO-2.	Implement the concept of Natural Language processing to problems leading to understanding of cognitive computing.
CO-3.	Attain the capability to represent various real life problems domains using logic based techniques and use this to perform inference or planning.
CO-4.	Use the various computing tools such as R, python and julia.
CO-5.	Implement data science concepts and methods to **solve** problems in real-world contexts and will **communicate** these solutions effectively.

P.G. DIPLOMA IN DATA SCIENCES
SEMESTER – I
PDDS-413: Big Data Analytics

Time: 3 Hours **Max. Marks: 100**
Credit Hours (per week):4 **Theory Marks:75**
Total Hours: 60 **Theory Internal Assessment Marks:25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from UNIT-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from UNIT-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.
Couse Objectives:

1.	Understands Big Data platform and its use cases
2.	Focuses on the techniques available for storage, retrieval and processing of Big Data
3.	To perform a variety of analytics on different data sets and to arrive at positive conclusions.

UNIT-I

Introduction to Big data : Introduction to Big Data Platform – Challenges of Conventional Systems - Intelligent data analysis – Nature of Data - Analytic Processes and Tools - Analysis vs Reporting.

UNIT-II

Mining data streams : Introduction To Streams Concepts – Stream Data Model and Architecture - Stream Computing - Sampling Data in a Stream – Filtering Streams – Counting Distinct Elements in a Stream – Estimating Moments – Counting Oneness in a Window – Decaying Window - Real time

Analytics Platform(RTAP) Applications - Case Studies - Real Time Sentiment Analysis- Stock Market Predictions.

Reference :

1. Michael Berthold, David J. Hand, "Intelligent Data Analysis", Springer, 2007.
2. Tom White "Hadoop: The Definitive Guide" Third Edition, O'reilly Media, 2012.
3. Chris Eaton, Dirk DeRoos, Tom Deutsch, George Lapis, Paul Zikopoulos, "Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data", McGrawHill Publishing, 2012.
4. Anand Rajaraman and Jeffrey David Ullman, "Mining of Massive Datasets", CUP, 2012.
5. Bill Franks, "Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics", John Wiley& sons, 2012.

Course Outcomes (COs):

On Completing the course, the students will be able to:

CO-1.	Understands Big Data and its implication in the real world
CO-2.	Ability to design algorithms to solve Data Intensive Problems
CO-3.	Efficiently store and process Big Data by analyzing the Big Data framework
CO-4.	Case Studies related to Real Time Sentiment Analysis and Stock Market Predictions.

P.G. DIPLOMA IN DATA SCIENCES
SEMESTER – I
PDDS-414P
Programming Laboratory
(Based on Python)

Time: 3Hrs **Max. Marks: 50**
Credit Hours (per week):4 **Practical Marks:37**
Total Hours: 60 **Practical Internal Assessment Marks: 13**

Course Objectives:

Enable the student to

1.	Understand the basics of python programming concepts.
2.	Develop programs using object-oriented features, graphical user interfaces and image processing
3.	Understand the high-performance programs designed to build up the real proficiency.

Programs based on Python

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Describe the Control statement, String, List, and Dictionaries in Python.
CO-2.	Understand the different types of function and File handling operations.
CO-3.	Interpret Object oriented programming in Python
CO-4.	Build the interactive python application using GUI.
CO-5.	Develop a multithreading and network application.

P.G. DIPLOMA IN DATA SCIENCES
SEMESTER – I

PDDS-415P
Programming Laboratory
(Based on AI and Data Science)

Time: 3Hrs **Max. Marks: 50**

Practical Marks: 37

Credit Hours (per week):4 **Practical Internal Assessment Marks: 13**

Total Hours: 60

Course Objectives:

1.	To understand the core concept of artificial intelligence and data science.
2.	To program computers to use example data or experience to solve a given problem.
3.	To enable students to handle various data sets.
4.	Problem-solving and critical thinking skills to create social, economical and sustainable impact.

Practical based on AI and Data Science

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Demonstrate Knowledge of the building blocks of AI as presented in term of intelligent agents.
CO-2.	Students will apply data science concept and methods to solve problems in real world context and will communicate with these solutions effectively.
CO-3.	Illustration of different types of processes and tools used in data science.
CO-4.	Application of principles of data science for analysis using Google sheet, excel and spreadsheet.
CO-5.	Understanding how to build and validate models and improve them iteratively.

P.G. DIPLOMA IN DATA SCIENCES

SEMESTER – II

Sr. No.	Paper	Paper Name	Theory	Internal	Practical	Total	Page no.
1	PDDS-421	Introduction to R	**75**	**25**	**-**	**100**	**644-646**
2	PDDS-422	Data Preparation and Analysis	**75**	**25**	**-**	**100**	**647-648**
3	PDDS-423	Introduction to Hadoop	**75**	**25**	**-**	**100**	**649-650**
4	PDDS-424P	Programming Laboratory (Based on R Language)	**-**	**13**	**37**	**50**	**651**
5	PDDS-425P	Programming Laboratory(Based On Hadoop)	**-**	**13**	**37**	**50**	**652**

P.G. DIPLOMA IN DATA SCIENCES
SEMESTER – II
PDDS-421: Introduction to R

Time: 3 Hours **Max. Marks: 100**
Credit Hours (per week):4 **Theory Marks:75**
Total Hours: 60 **Theory Internal Assessment Marks:25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from UNIT-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from UNIT-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.
Objectives:

1.	This course introduces R, which is a popular statistical programming language.
2.	The course covers data reading and its manipulation using R, which is widely used for data analysis internationally. Understand and implement functions that support linear modelling, non-linear modelling, classical statistics, classifications, clustering and more.
3.	The course also covers different control structures and design of user-defined functions.
4.	Learn how to develop the program in R Programming.
5.	Learn how to develop an open-source scripting language for predictive analytics and data visualization.

UNIT-I

Introduction: Learn to use help() function. Understand data types in R (logical, numeric, etc.) .Convert data types .Create, find, and remove data (vector, matrix, data frame) in R .Read external data into R (.txt, .csv) .Write R data into external files (.txt, .csv) .Understand and manipulate strings (e.g. substr(), scan()).Understand indexing of data in vectors, matrices, and data frames. Graphing techniques to visualize data selection.

Operators: Learn about operators (mathematics, logical, miscellaneous).Learn about basic math functions (e.g. sum()).Use operators and math functions on variables Learn about ifelse() function .Use ifelse() function on vectors and matrices. Use graphs to show the results.

UNIT-II

Loops: Understand how loops work in R. Create your own loop for vectors. Create a series of graphs with loop functions. Learn to use break and next statements in loops. Use loops to create and change data in vectors, matrices, and arrays. Use loops to create data as a list. Learn about double loops. Create your own double loops for matrix. Use operators and functions in single and double loops. Understand if else statement. Use if else statement for data manipulation. Compare if else statement with ifelse() function. Use ifelse() function in loops .Combine loops and if else statement. Represent your results with graphs. Use math functions in loops. Use math functions in if else statement. Show your results with graphs.

Functions: Understand advanced functions such as apply() and by().Use apply() and by()to calculate descriptive statistics. Create graphs for the calculated descriptive statistics. Understand customized functions. Interpret customized functions. Compare customized functions and build-in functions.Understand global parameters for graphing. Understand specific parameters in graph functions. Learn different ways to save your graphs.Learn to combine loops and customized functions. Learn to use customized functions in customized functions .Learn to save your functions and reuse them whenever needed.

Reference :

1. A First Course in Statistic Programming with R by Braun & Murdoch
2. A Beginner's Guide to R by Zuur
3. R in a Nutshell by Adler
4. An introduction to R by Venables & Smith
5. Machine Learning with R by Brettlantz.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Develop an R script and execute on R Programming Environment.
CO-2.	Install, load and deploy the required packages, and build new packages for sharing and reusability.
CO-3.	Utilize R Data types for developing programs and learn all the basics of R-Programming (Data types, Variables, and Operators.
CO-4.	Join columns and rows in a data frame using bind functions, developing packages, data frames, and string manipulation functions.
CO-5.	Learning with different file systems and CSV file systems.
CO-6.	Visualize and summarize the data and design application with database connectivity for data analysis.

P.G. DIPLOMA IN DATA SCIENCES
SEMESTER – II
PDDS-422: Data Preparation and Analysis

Time: 3 Hours **Max. Marks: 100**
Credit Hours (per week):4 **Theory Marks:75**
Total Hours: 60 **Theory Internal Assessment Marks:25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from UNIT-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from UNIT-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.
Course Objectives:

1.	To help look at data before making any assumptions.
2.	To help identify obvious errors, as well as better understand patterns within the data, detect outliers or anomalous events, find interesting relations among the variables.
3.	To analyze datasets to summarize their main characteristics, often with visual methods.
4.	To illustrate the types of data used and stored within the system, the relationships among these data types.
5.	To understand the data better and use tools effectively to gain valuable insights or draw conclusions.

UNIT-I

Introduction: Source of Data, Process for Making Sense of Data

Describing Data: Observations and Variables, Types of Variables, Central Tendency, Distribution of the Data, Confidence Intervals, Hypothesis Tests

Preparing Data Tables: Cleaning the Data, Removing Observations and Variables, Generating Consistent Scales Across Variables, New Frequency Distribution, Converting Text to Numbers, Converting Continuous Data to Categories, Combining Variables, Generating Groups, Preparing Unstructured Data

UNIT-II

Understanding Relationship: Visualizing Relationship Between Variables, Calculating Metrics About Relationships

Identifying and Understanding Groups: Clustering, Association Rules, Leaning Decision Trees from Data

Building Models From Data: Linear Regression, Logistic Regression, k-Nearest Neighbors, Classification and Regression Trees

References:

1. Making sense Of Data I: A Practical Guide to Exploratory Data Analysis and Data Mining, by GlennJ.Myatt and Wayne P.Johnson
2. The Visual Display of Quantitative Information, by Edward R.Tufte
3. Visualizing Data: exploring and Explaining Data with the Processing environment,by Ben Fry
4. Exploratory Data Mining and Data Cleaning, by Tamraparni Dasu

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Improved understanding of variables by extracting averages, mean, minimum, and maximum values etc.
CO-2.	Knowledge about the problem-solving steps involved in the data science model-building life cycle.
CO-3.	Understanding of the basic concept of data cleaning for valuable information with a minimum consistency checking.
CO-4.	Understanding statistical exploratory analysis with hypothesis generation.

P.G. DIPLOMA IN DATA SCIENCES
SEMESTER – II
PDDS-423: Introduction to Hadoop

Time: 3 Hours **Max. Marks: 100**
Credit Hours (per week):4 **Theory Marks:75**
Total Hours: 60 **Theory Internal Assessment Marks:25**

Note: 1. Medium of Examination is English Language.
2. The question paper covering the entire course shall be divided into three sections.

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry **2.5 marks** with answer to each question up to 10 lines in length. The total weightage being **15 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from UNIT-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from UNIT-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **15 marks.** The total weightage of this section shall be **30 marks**.
Course Objectives:

Enable the student to

1.	Demonstrate the programming concepts of Hadoop.
2.	Describe the big data concepts, data analytics life cycle and applications.
3.	Illustrate the different eco system components of Hadoop.
4.	Develop MapReduce programs for real world problems.

UNIT-I

Introduction: History of Hadoop, The Hadoop Distributed File System, Components of Hadoop, Analysing the Data with Hadoop, Scaling Out, Hadoop Streaming, Design of HDFS, Java interfaces to HDFS Basics ,Developing a Map Reduce Application, How Map Reduce Works, Anatomy of a Map, Reduce Job run, Failures, Job Scheduling, Shuffle and Sort, Task execution, Map Reduce Types and Formats, Map Reduce Features Hadoop environment.

UNIT-II

Frameworks: Applications on Big Data Using Pig and Hive, Data processing operators in Pig, Hive services, HiveQL, Querying Data in Hive, fundamentals of HBase and ZooKeepe, IBM InfoSphere BigInsights and Streams.Predictive Analytics, Simple linear regression, Multiple linear regression, Interpretation 5 of regression coefficients. Visualizations - Visual data analysis techniques, interaction techniques, Systems and applications.

References:

1. Michael Berthold, David J. Hand, "Intelligent Data Analysis", Springer, 2007.
2. Tom White "Hadoop: The Definitive Guide" Third Edition, O'reilly Media, 2012.
3. Chris Eaton, Dirk DeRoos, Tom Deutsch, George Lapis, Paul Zikopoulos, "Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data", McGrawHill Publishing, 2012.
4. Anand Rajaraman and Jeffrey David Ullman, "Mining of Massive Datasets", CUP, 2012.

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Identify Big Data and its Business Implications.
CO-2.	List the components of Hadoop and Hadoop Eco-System.
CO-3.	Access and Process Data on Distributed File System.
CO-4.	Manage Job Execution in Hadoop Environment.
CO-5.	Develop Big Data Solutions using Hadoop Eco System.

P.G. DIPLOMA IN DATA SCIENCES
SEMESTER-II

PDDS-424 P
Programming Laboratory
(Based on R Language)

Time: 3Hrs **Max. Marks: 50**
Credit Hours (per week):4 **Practical Marks: 37**
Total Hours: 60 **Practical Internal Assessment Marks: 13**

Course Objectives:

1.	Understand and implement functions that support linear modelling, non-linear modelling, classical statistics, classifications, clustering and more.
2.	Learn how to develop the program in R Programming. Learn how to develop an open-source scripting language for predictive analytics and data visualization.

Programs based on R Language

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Show the installation of the R Programming Environment.
CO-2.	Utilize R Data types for developing programs and Learn all the basics of R-Programming (Data types, Variables, and Operators.
CO-3.	Implementation of R-loops with different examples, learn the basics of functions in R and implement with example.
CO-4.	Join columns and rows in a data frame using bind functions, developing packages, data frames,and string manipulation functions.
CO-5. Learning with different file systems and CSV file systems.	

P.G. DIPLOMA IN DATA SCIENCES
SEMESTER-II

PDDS-425 P
Programming Laboratory
(Based on Hadoop)

Time: 3Hrs **Max. Marks: 50**

Practical Marks: 37

Credit Hours (per week):4 **Practical Internal Assessment Marks: 13**

Total Hours: 60

Course Objectives:

Enable the student to

1.	Demonstrate the programming concepts of Hadoop with practice.
2.	Implement the big data concepts, data analytics life cycle and applications.
3.	Illustrate the different eco system components of Hadoop.
4.	Develop MapReduce programs for real world problems.

Practical based on Hadoop

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Identify Big Data and its Business Implications.
CO-2.	List the components of Hadoop and Hadoop Eco-System
CO-3.	Access and Process Data on Distributed File System
CO-4.	Manage Job Execution in Hadoop Environment
CO-5.	Develop Big Data Solutions using Hadoop Eco System

CERTIFICATE COURSE IN WEB DESIGNING

Sr. No.	Paper	Paper Name	Marks			Duration	Total Duration	Page No.
			Theory	Practical	Total			
1	Paper-I	Web Designing using HTML	30	70	100	3Months	6Months	654-655
2	PAPER–II	CSS, JavaScript and Bootstrap for Web Developer	30	70	100	3Months		656-657

CERTIFICATE COURSE IN WEB DESIGNING

PAPER–I: Web Designing using HTML

Time: 3 Hrs. **M.M: 100**
Credit Hours(per week):4 **Theory Marks: 30**
Total Hours: 60 **Practical Marks: 70**

Note: 1. The question paper covering the entire course shall be divided into three sections.
2.Medium of Examination is English Language.

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 5 questions. Each question will carry **02 marks** with answer to each question up to 10 lines in length. The total weightage being **10 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from UNIT-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **05 marks.** The total weightage of this section shall be **10 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from UNIT-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **05 marks.** The total weightage of this section shall be **10 marks**.

Course Objectives:

At the end of the course, the students will be able to:

1.	Writing code in HTML and CSS
2.	Personalize web pages using text formatting, graphics, audio, and video
3.	Plan and design a web application from scratch

UNIT-I

Introduction to Internet : About internet and its working, business use of internet, internet services, evolution of Internet, Internet Service Provider (ISP), internet addressing (DNS) and IP addresses, WWW introduction, working of WWW, Web browsing (opening, viewing, saving and printing a web page).

Introduction to HTML, DHTML

Introduction to the concept of Hypertext and Hypermedia.
HTML Tools.
HTML Tags, Hypertext and Anchors.

Different Image Formats and their creation.
Tables – Table based tags, Adding image within tables.

UNIT-II

Forms and Form Controls, Processing of Forms.
Frames – Formatting of Frames, Nested Frames, In-line Frames.
Style Sheets – Combining with HTML documents, Properties of Style Sheet.
Multimedia – Adding GIF, Sound and Videos
Publishing a Web-site

References:

1. Mastering HTML, CSS & Javascript Web Publishing by Laura Lemay, Rafe Colburn,Jennifer Kyrnin
2. HTML & CSS: The Complete Reference, Fifth Edition by Thomas A. Powell
3. HTML, XHTML and CSS For Dummies By Ed Tittel , Jeff Noble

Course Outcomes:
On Completing the course, the students will be able to:

CO-1.	Do code in HTML and CSS
CO-2.	Personalize web pages using text formatting, graphics, audio, and video
CO-3.	Design a web application using HTML and CSS

CERTIFICATE COURSE IN WEB DESIGNING

PAPER–II: CSS, JavaScript and Bootstrap for Web Developer

Time: 3 Hrs. **M.M: 100**
Credit Hours(per week):4 **Theory Marks: 30**
Total Hours: 60 **Practical Marks: 70**

Note: 1.The question paper covering the entire course shall be divided into three sections.
5. Medium of Examination is English Language.

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 5 questions. Each question will carry **02 marks** with answer to each question up to 10 lines in length. The total weightage being **10 marks**.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from UNIT-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **05 marks.** The total weightage of this section shall be **10 marks.**

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from UNIT-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **05 marks.** The total weightage of this section shall be **10 marks**.

Course Objectives:

1.	Understand the advantages of using a component CSS framework.
2.	Know the benefits of reusability in design and development
3.	How grid work and how to use them in mobile and responsive design
4.	Obtain an introduction to compiled CSS with LESS
5.	How to work with 3rd party components
6.	Integrate in existing web projects for fast development
7.	Learn what other web tools use Bootstrap

UNIT-I

Cascading Style Sheets (CSS3):

Introduction to CSS 3, New CSS 3 Selectors, Attribute Selectors, First-of-type, Last-of-type
Nth-child, Element: empty, New CSS3 Properties, Custom Fonts, Text-Shadow Property
Text-Stroke Property, Rounded Corners, Box Shadows, CSS Gradients, CSS Multiple backgrounds
Opacity Property, Transition effect, Transform effect, Animation effects, CSS Media Queries

CSS Framework:

Web Site Development using W3.CSS Framework W3.CSS Intro, W3.CSS Colors, W3.CSS Containers, W3.CSS Panels, W3.CSSBorders, W3.CSSFonts W3.CSS Text, W3.CSS Tables, W3.CSS List, W3.CSSImages, W3.CSS Grid.

UNIT-II

Responsive Web Design with Bootstrap:

Introduction to Responsive Design, Mobile first design concepts, Common device dimensions View-port tag, Using css media queries, Menu conversion script, Basic Custom Layout, Introduction to Bootstrap, Installation of Bootstrap, Grid System, Forms, Buttons, Icons Integration

JavaScript

Introduction to Client side Scripting Language, Introduction to Java Script, JavaScript Types, Variables in Java Script, Operators in JS, Conditions Statements, JS Popup Boxes, JS Events, Basic Form Validations in JavaScript.

Development of any application /portal/Blog using CSS, JavaScript and bootstrap

References:

1. HTML5, Black Book, Kagent Learning Solution Inc, 2014

2. Mastering HTML, CSS &JavaScript Web Publishing by Lemay Laura, BPB publications

3. HTML & CSS: The Complete Reference by Thomas Powell

4. Web Design, McGraw –hill

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Use the advantages of using a component CSS framework.
CO-2.	Know the benefits of reusability in design and development
CO-3.	How grid work and how to use them in mobile and responsive design
CO-4.	Understand the concept of CSS with LESS
CO-5.	How to work with 3rd party components
CO-6.	Able to analyse web projects for fast development
CO-7.	Able to use web tools with Bootstrap

CERTIFICATE COURSE IN OFFICE AUTOMATION

Sr. No.	Paper	Paper Name	Marks			Duration	Total Duration	Page No.
			Theory	Practical	Total			
1	Paper-I	Introduction to MS- Word	30	70	100	3Months	6Months	659-660
2	PAPER –II	Introduction to MS- Excel	30	70	100	3Months		661-662

CERTIFICATE COURSE IN OFFICE AUTOMATION
PAPER–I: Introduction to MS-Word

Time: 3 Hrs. **M.M: 100**
Credit Hours(per week):4 **Theory Marks: 30**
Total Hours: 60 **Practical Marks: 70**

Note: 1.The question paper covering the entire course shall be divided into three sections.
2.Medium of Examination is English Language.

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 5 questions. Each question will carry **02 marks** with answer to each question up to 10 lines in length. The total weightage being **10 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from UNIT-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **05 marks.** The total weightage of this section shall be **10 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from UNIT-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **05 marks.** The total weightage of this section shall be **10 marks**.
Course Objectives:

Enable the student to

1. To be proficient in office automation applications.
2. Handle the word processing software.
3. Understand that in In Today's commercial world, automation helps the users with a sophisticated set of commands to format, edit, and print text documents.
4. Use it as valuable and important tools in the creation of applications such as newsletters, brochures, charts, documents, drawings and graphic images.

UNIT-I

MS-Word: Introduction to Ms-Office, Introduction to MS-Word ,Parts of window of word (Title bar, menu bar, status bar, ruler) , Creation of new documents, opening document ,insert a document into another document. Page setup, margins, gutters, font properties, A!ignment, page breaks, header footer ,deleting ,moving, replace, editing text in document.

UNIT-II

Saving a document, spell checker, printing a document. Creating a table, entering and editing, Text in tables. Changing format of table, height width of row or column. Editing, deleting Rows, columns in table. Borders, shading, Templates, wizards, Drawing objects, mail merge.

References:

1. **Office 2010 Bible by John Walkenbach , Herb Tyson , Michael R. Groh, Faithe Wempen**
2. **WORD 2010 FOR DUMMIES By Dan Gookin**
3. **MS–Office , Compiled by SYBIX.**
4. **Word 2010 in Simple Steps by Kogent Learning Solutions Inc.**

Course Outcomes:

On Completing the course, the students will be able to:

CO-1.	Use word processors, spreadsheets, presentation software.
CO-2.	Describe the features and functions of the categories of application software.
CO-3.	Understand the dynamics of an office environment.
CO-4.	Demonstrate the ability to apply application software in an office environment.

CERTIFICATE COURSE IN OFFICE AUTOMATION
PAPER–II MS-Excel

Time: 3 Hrs. **M.M: 100**
Credit Hours(per week):4 **Theory Marks: 30**
Total Hours: 60 **Practical Marks: 70**

Note:1. The question paper covering the entire course shall be divided into three sections.
2.Medium of Examination is English Language.

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 5 questions. Each question will carry **02 marks** with answer to each question up to 10 lines in length. The total weightage being **10 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from UNIT-I of the syllabus. The students will be required to attempt any two questions. Each question will carry **05 marks.** The total weightage of this section shall be **10 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from UNIT-II of the syllabus. The students will be required to attempt any two questions. Each question will carry **05 marks.** The total weightage of this section shall be **10 marks**.
Course Objectives:

Enable the student to

1. To be proficient in office automation applications.
2. Handle the Spreadsheet software.
3. Understand that in In Today's commercial world, automation helps the users with a sophisticated set of commands to format, edit, and print text documents.
4. Use it as valuable and important tools in MS-Excel.

UNIT-I

MS-Excel: Worksheet basics, creating worksheet, entering into worksheet, heading information, data, text, dates, alphanumeric values, saving & quitting worksheet, Opening and moving around in an existing worksheet, Toolbars and Menus, Keyboard shortcuts, Working with single and multiple workbook, Working with tables.

UNIT-II

Working with formulae & cell referencing, Auto sum, Coping formulae, Absolute & relative addressing, Worksheet with ranges, formatting of worksheet, Previewing & Printing worksheet, Graphs and charts, Database, Creating and Recording macros, Multiple worksheets- concepts, creating and using.

References:

1. **MS–Office , Compiled by SYBIX.**
2. **Excel 2010 For Dummies by Greg Harvey**
3. **Excel 2010 in Simple Steps by Kogent Learning Solutions Inc.**
4. **Office 2010 Bible by John Walkenbach , Herb Tyson , Michael R. Groh, Faithe Wempen**

Course Outcomes:

On Completing the course, the students will be able to:

CO-1	Use word processors, spreadsheets software.
CO-2	Describe the features and functions of the categories of application software.
CO-3	Understand the dynamics of an office environment.
CO-4	Demonstrate the ability to apply different types of formulas.