FACULTY OF SCIENCES

SYLLABUS FOR THE BATCH FROM 2024 to 2027

Programme Code: BSHZ

Programme Name: B.Sc. Hons. Zoology

(Semester I- II)

Examinations: 2024-2025

Department of Zoology

Khalsa College, Amritsar

S. No.	PROGRAMME OBJECTIVES
1.	To inculcate scientific temperament to broaden the outlook of students.
2.	To provide students a launch-pad for higher education.
3.	Skill development through practical, enabling them to solve common problems in their daily life.
4.	To undertake activities like field survey, photography, projects etc. to unearth their hidden talents.
5.	Holding Science exhibition, poster competition and educational trips, shaping their personality and preparing their minds to face, think and act in different situations.
6.	Participation in various cultural programs to build their confidence which help them to interact with different individuals in the society and work for welfare of the community.

S. No.	PROGRAMME SPECIFIC OUTCOMES (PSOS)
PSO-1	It is one of the most fundamental units of basic sciences studied at undergraduate level.
PSO-2	The programme helps to develop scientific tempers and attitudes which in turn can be useful for the scientific developments that make a nation or society to grow at a rapid pace.
PSO-3	After the completion of this course, students have the option to go higher studies i.e. Ph.D. and then do research work for the welfare of mankind
PSO-4	After higher studies, students can join as scientist or assistant professor and can even look for professional job oriented courses, such as civil services
PSO-5	Students can go to serve in industries and opt for establishing their own industrial units

B.Sc.(Hons.) Zoology Program Code: BSHZSession 2023-24

Semester-I											
S. No.	Course Code	Course Title	Credits L	T	P	Total credits	Hrs /Wk	M. M.	IA	Total Marks	PP
Major Course 06											
1	ZHZ-111	Biology of Non-Chordates-I	3	1	-	4	4	75	25	100	4
2	ZHZ-112	Zoology Lab-I	-	-	2	2	4	37	13	50	6
Minor Course 06											
3	BHZ-111	Cryptogams-I	3	1	-	4	4	75	25	100	8
4	BHZ-112	Botany Lab-I	-	-	2	2	4	37	13	50	10
Multidisciplinary Course 06											
5	PHU-111	Optics-I	3	-	-	3	3	56	19	75	11
6	PHU-112	Physics Lab-I	-	-	1	1	2	19	06	25	13
7	MHZ-111	Bio-Mathematics-I	1	1	-	2	2	37	13	50	15
General Elective (Compulsory) 08											
8	BCEN-1123	Communicative English-I	2	1	1	4	4	60+ 15	25	100	17
9	BHPB-1101/ BPBI-1102/ BPHC-1104	Punjabi compulsory/ Basic Punjabi/ Punjab History and Culture-I	4	-	-	4	4	75	25	100	19 20 21
Value Added Course 02											
10	ZDA-111	Drug Abuse: Problem of Drug Abuse	2	-	-	2	2	50	-	50	23

Semester-II											
S. No.	Course Code	CourseTitle	Credits L	T	P	Total credits	Hrs /Wk	M. M.	IA	Total Marks	PP
Major Course 06											
1	ZHZ-121	Biology of Non-Chordates-II	3	1	-	4	4	75	25	100	25
2	ZHZ-122	Zoology Lab-II	-	-	2	2	4	37	13	50	27
Minor Course 06											
3	BHZ-121	Cryptogams-II	3	1	-	4	4	75	25	100	29
4	BHZ-122	Botany Lab-II	-	-	2	2	4	37	13	50	31
Multidisciplinary Course 06											
5	PHU-121	Optics-II	3	-	-	3	3	56	19	75	32
6	PHU-122	Physics Lab-II	-	-	1	1	2	19	06	25	34
7	MHZ-121	Bio-Mathematics-II	1	1	-	2	2	37	13	50	36
General Elective (Compulsory) 08											
8	BCEN-1223	Communicative English-II	2	1	1	4	4	60+ 15	25	100	38
9	BHPB-1201/ BPBI-1202/ BPHC-1204	Punjabi compulsory/ Basic Punjabi/ Punjab History & Culture-II	4	-	-	4	4	75	25	100	40 41 42
Value Added Course 02											
10	ZDA-121	Drug abuse: Management & Prevention	2	-	-	2	2			50	43

Semester I

COURSE CODE: ZHZ-111

COURSE TITLE: BIOLOGY OF NON-CHORDATES-I

Credit Hours/week: 4
LTP: 310
Theory Paper: 75
Internal Assessment: 25
Periods/week: 6 **Total Marks: 100**

Instructions for the Paper Setters:

1. There will be five sections.
2. Section A is compulsory and will be of 15 marks consisting of eight short answer type questions carrying 2.5 marks each covering the whole syllabus. The answer should not exceed 50 words. The candidate will have to attempt any 6 questions in this section.
3. Section B, C, D and E will be set from units I, II, III and IV respectively and will consists of two questions of 15 marks each from the respective units. The candidates are required to attempt one question from each of these sections. Each question in these sections should not have more than two sub-parts.

COURSE OBJECTIVES: The paper aims to

1	Understand the animal kingdom.
2	Understand the origin and evolutionary relationships and taxonomic positions of phylum Protozoa to Annelida.
3	Understand the general characteristics and body organization of animals belonging to Protozoa to Annelida.

UNIT-I

- Protozoa : Type study
  - *Amoeba proteus* (Amoeboid movements)
  - *Euglena viridis*
  - *Paramecium (*Kappa particles)

UNIT-II

- Porifera : special reference to different canal systems
  Type study
  - *Sycon*
- Coelenterata : Type study
  - *Obelia*
- Ctenophora: General characteristics, comparison with coelenterates and their evolutionary significance.

UNIT-III

- Platyhelminthes : Type study
  - *Fasciola hepatica*
  - *Taenia solium*
- Pathogenicity and prophylaxis of both.

UNIT-IV

- Aschelminthes :Type study
  - *Ascaris*

- Parasitic adaptations in Helminthes
- Annelida *:* Type study
    - *Pheretima posthuma*

Books Recommend:

1. Barnes, R.D., Invertebrate Zoology, Saunders W.B., Co., Philadelphia, 1980.
2. Dhami, P.S. and Dhami, J.K., Invertebrate Zoology, 5th ed., R. Chand & Co., New Delhi, 2004.
3. Kotpal, R.L., Modern Text Book of Zoology, Invertebrates, 10th ed., Rastogi Publications, Meerut, 2012.
4. Parker, T.J. and Haswell, W.A., Text book of Zoology, Invertebrates, 7th ed., Vol. I (eds. A.J. Marshall & W.D. Williams), CBS Publishers & Distributors, Delhi, 1992.

COURSE OUTCOMES

CO-1.	The subject of non-chordates helps the students to know about the structural aspects of different animals
CO-2.	Students also gain knowledge about the taxonomies and evolutionary aspects of Zoology.
CO-3.	To study faunal diversity and learn to implement conservation measures to save biodiversity

Semester-I
COURSE CODE: ZHZ-112
COURSE TITLE: Zoology Lab-I
(Related to ZHZ-101)

Credit Hours/week: 2
Practical Paper: 37
Internal Assessment: 13
Periods/week: 6 **Total Marks: 50**

Important Note for Practical:

1. Candidates will be required to submit their original note books containing record of their laboratory work.
2. Wherever possible, students must be taken out for excursion to the field (Zoological gardens, sea shores, ponds and hill stations etc.) to study habitat and ecology of the animals.
3. As per the latest UGC guidelines the dissections may please be avoided. In no case an animal falling under the categories of wildlife protection act 1972 should be caught or dissected. The rules of the Prevention of cruelty to Animals act 1960 should be familiar to all who are teaching the Zoology courses.

COURSE OBJECTIVES: The paper aims to:

1	Understand the structure of invertebrates and classify them.
2	Understand the structure and function of digestive, reproductive & nervous system of earthworm.
3	Understand the preparation of temporary slides.
4	Study permanent stained slides of animals from protozoa to annelida.

I.	Classification up to orders and study of the specimens mentioned against each phylum with ecological note and economic importance if any	
	Protozoa:	*Amoeba, Euglena, Trypanosoma, Noctiluca, Eimeria, Monocystis, Paramecium, Opalina, Vorticella, Balantidium, Nyctotherus and Polystomella, Radiolarian, Forminiferan.*
	Porifera:	*Sycon, Grantia, Spongilla, Euplectella, Hyalonema, Chalina, Euspongia.*
	Coelenterata:	*Porpita, Velella, Physalia, Aurelia, Metridium, Alcyonium, Tubipora, Zooanthus, Madrepora, Favia, Fungia, Gorgonia, Pennatula.* *Obelia* (colony, medusa and polyp), *Sertularia, Tubipora, Plumularia, Pennaria, Bougainvillea.*
	Platyhelminthes:	*Planaria, Fasciola, Taenia, Dugesia,Echinococcus*
	Aschelminthes:	*Ascaris* (male and female), *Trichinella, Ancylostoma*
	Annelida:	*Pheretima, Lumbricus, Nereis, Heteronereis, Polynoe, Aphrodite, Amphitrite, Chaetopterus, Arenicola, Hirudinaria, Pontobdella*
II	**Study of Permanent slides**	
	Porifera:	Spicules, Gemmules, *Sycon* (T.S. and L.S.).
	Coelenterata:	*Hydra* (W.M.) with bud, T.S. through the regionsof testis and ovary
	Platyhelminthes:	*Fasciola* (W.M. & T.S.), Miracidium, Sporocyst, Redia,

		Cercaria and Metacercaria larvae of *Fasciola*, *Taenia* (scolex, mature and gravid proglottids)
	Aschelminthes:	*Ascaris* (T.S. male and female)
	Annelida:	Earthworm (T.S. typhlosolar and pharyngeal region, through gizzard), spermathecae , setae and septal nephridium; Parapodia of *Nereis*
III	**Temporary mounts:**	Gemmules and spicules of *Sycon*
IV	**Culture Preparation:**	*Paramecium*
V	**Study of systems through charts/models**	
	Pheretima posthuma:	Digestive, Reproductive and Nervous system
	Ascaris:	Reproductive and Nervous system
VI	**Students must be taken out to study biodiversity among invertebrates**	

Guide lines for conduct of practical Examination:-

1.	Identify and classify the specimens A-D up to order. Write a note on their habit, habitat, special features and economic importance.	12
2.	Identify the slides/models E-G and give two reasons for identification.	9
3.	Identify the systems by using models.	4
4.	Preparation of Temporary mount	4
5.	Project/ Assignment report	3
6.	Viva-voce & Practical file.	5

*Minor changes in the practicals can be done depending upon availability of the materials.

COURSE OUTCOMES:

CO-1.	Have a knowledge about all the different phyla of invertebrates
CO-2.	Understand the comparative structure of invertebrates
CO-3.	Have an insight about the microscopic life
CO-4.	Differentiate invertebrates on the basis of morphological characteristics

Semester-I

COURSE CODE: BHZ-111

COURSE TITLE: CRYPTOGAMS-I

Credit Hours/week: 4
LTP: 310
Theory Paper: 75
Internal Assessment: 25
Periods/week: 6 **Total Marks: 100**

Instructions for the Paper Setters:

1. There will be five sections.
2. Section A is compulsory and will be of 15 marks consisting of eight short answer type questions carrying 2.5 marks each covering the whole syllabus. The answer should not exceed 50 words. The candidate will have to attempt any 6 questions in this section.
3. Section B, C, D and E will be set from units I, II, III and IV respectively and will consists of two questions of 15 marks each from the respective units. The candidates are required to attempt one question from each of these sections. Each question in these sections should not have more than two sub-parts.

COURSE OBJECTIVES:

1	To acquaint students with basic concepts of diversity of Algae, Fungi, Lichens etc.
2	To study systematic Position, structure, and function of these microbes.

Unit –I

- **Algae:** Habit and habitat, general characters, distribution, classification and economic importance of Algae.
- Structure, reproduction and life cycle of:
  - **Cyanophyta:** *Oscillatoria* and *Nostoc*
  - **Chlorophyta**: *Ulothrix* and *Spirogyra*

Unit –II

- Structure, reproduction and life cycle of:
  - **Xanthophyta**: *Vaucheria*
  - **Phaeophyta**: *Ectocarpus* and *Sargassum*
  - **Rhodophyta**: *Batrachospermum* and *Polysiphonia*

Unit – III

- **Fungi:** Occurrence and distribution, general characteristics, classification and economic importance of Fungi.
- General characteristics, structure, reproduction and life cycle of:
  - **Mastigomycotina:** *Phytophthora*
  - **Zygomycotina**: *Rhizopus*
  - **Ascomycotina**: *Peziza*, *Penicillium*

Unit-IV

- General characteristics, Structure, reproduction and life cycle of:
  - **Basidiomycotina**: *Puccinia, Agaricus*
  - **Deuteromycotina:** *Colletotrichum*, *Alternaria*
- **General account of Lichens.**

Suggested Readings:

1. Alexopolous, J. and W. M. Charles. 1988. Introduction to Mycology. Wiley Eastern, New Delhi.
2. Dube, H.C.1990. An Introduction to Fungi, Vikas Publishing House, Pvt. Ltd. Delhi.
3. Pandey, B. P. 2001. College Botany, Vol. I: Algae, Fungi, Lichens, Bacteria, Viruses, Plant Pathology, Industrial Microbiology and Bryophyta. S. Chand & Company Ltd, New Delhi.
4. Sharma, O.P. 1992. Text Book of Thallophytes, McGraw Hill Publishing Co. New Delhi.
5. Sharma, P.D. 1991. The Fungi, Rastogi and Co, Meerut.
6. Thakur, A. K. and S. K. Bassi, 2008. A Textbook of Botany: Diversity of Microbes and Cryptogams. S. Chand & Company Ltd, New Delhi.
7. Vashishta, B. R. 1990. Botany for Degree Students: Fungi, S. Chand & Company Ltd, New Delhi.

COURSE OUTCOMES:

CO-1	This course makes student aware about the diversity in various life forms of plant kingdom
CO-2	It enables students to identify algae and fungi.
CO-3	It is the basis of advanced study in botany.
CO-4	It enables students to differentiate structural differences.
CO-5	Increase the awareness and appreciation of human friendly algae and their economic importance.

Semester–I

COURSECODE: BHZ-112

COURSETITLE: Botany Lab I (Cryptogams-I)

Credit Hours/week: 2
LTP: 002
Practical Paper: 37
Internal Assessment: 13
Periods/week: 6 **Total Marks: 50**

COURSE OBJECTIVES: The paper aims to

1	Study the morphology of algae and fungi.
2	Study diseases of algae and fungi.
3	Study the various types of Lichens and their reproductive structures

1. To study the morphology of various genera included in algae:
   *Oscillatoria*and *Nostoc*
   *Ulothrix*and *Spirogyra*
   Vaucheria
   Ectocarpus
   Batrachospermum and *Sargassum*
2. To study the morphology and reproductive stages of various genera included in fungi:
   Phytophthora
   Rhizopus
   Saccharomyces
   Agaricus
   Peziza
3. To study disease samples along with spores and life cycle in:
   Puccinia
   Colletotrichum
   Alternaria
4. To Study the various types of Lichens and their reproductive structures (soredia and apothecium):
   Crustose
   Foliose
   Fructicose
5. To study Mycorrhizae:
   Ectomycorrhiza
   Endomycorrhiza

COURSE OUTCOMES:

CO-1.	To understand the external structure of algae and fungi.
CO-2.	To study disease samples along with spores and life cycle
CO-3.	Study the various types of Lichens and their reproductive structures

Semester-I
COURSE CODE: PHU-111
COURSE TITLE: OPTICS-I

Credit Hours/week: 3
LTP: 300
Theory Paper: 56
Internal Assessment: 19
Periods/week: 4 **Total Marks: 75**

Instructions for the Paper Setters:

1. There will be five sections.
2. Section A is compulsory and will be of 12 marks consisting of eight short answer type questions carrying 2 marks each covering the whole syllabus. The answer should not exceed 50 words. The candidate will have to attempt any 6 questions in this section.
3. Section B, C, D and E will be set from units I, II, III and IV respectively and will consists of two questions of 11 marks each from the respective units. The candidates are required to attempt one question from each of these sections. Each question in these sections should not have more than two sub-parts.

COURSE OBJECTIVES:

1	To gain theoretical knowledge and an in depth understanding of properties of light like reflection, refraction, interference, diffraction and polarization.
2	Its subsequent applications in the design and working of different optical instruments used in various fields of science.

UNIT-I

Ray Optics: Reflection of light, Refraction of light, Total internal reflection and its applications, Lenses, Lens maker's formula, Refraction and dispersion through a prism, Scattering of light, Microscope and its magnifying power.

UNIT-II

Interference: Young's experiment, Coherent Source, Phase and path differences, Theory of interference fringes, Fresnel's biprism, Thickness of thin transparent sheet, Interference in thin film due to reflected and transmitted light, Colour of thin film, Newton's rings and their applications, Michelson interferometer, Febry-Perot Interferometer, Anti reflection coatings.

UNIT-III

Diffraction: Introduction, Fraunhoffer diffraction at a single slit and its discussion, Fraunhoffer diffraction at double slit, Missing orders in a double slit, Diffraction of N slits and its discussion, Diffraction grating, dispersive power, Rayleigh criterion for resolving power, Resolving power of a diffraction grating.

UNIT-IV

Polarization: Transverse nature of light, Polarization by reflection and refraction, Brewster's Law, Malus Law, Double refraction, Nicol Prism, Elliptically and circularly polarized light, Quarter-wave and half-wave plates, Production and detection of polarized light, Optical activity, Specific rotation. Half shade polarimeter.

Reference Books:

1. Bhatia, T. S., Sharma, V. K. S. Vikas & Company: A Text Book of Optics.
2. Ghatak, Ajoy: Optics. Tata Mc Graw Hill Publishing Company Limited.
3. Jenkins and White: Fundamentals of Optics.
4. Subramanayam, N., Lal, B. and Avadhanulu, M. N.: A Text Book of Optics

COURSE OUTCOMES:

	On completing the course, the students will be able to:
CO-1	Gain knowledge about wave theory of light.
CO-2	Acquire in depth understanding of properties of light like reflection, refraction, interference, diffraction and polarization
CO-3	Understand the applications of interference in design and working of interferometers.
CO-4	Comprehend the concept of Polarization through thorough understanding of electromagnetic waves and their transverse nature.
CO-5	Understand the applications of diffraction and polarization in various optical instruments.

Semester-I
COURSE CODE: PHU-112
COURSE TITLE: Physics Lab-I

Credit Hours/week: 1
LTP: 001
Practical Paper: 19
Internal Assessment: 06
Periods/week: 3 **Total Marks: 25**

General Guidelines for Practical Examination

I. The distribution of marks is as follows:
- **i)** One experiment- **9Marks**
- **ii)** Brief Theory- **3Marks**
- **iii)** Viva–Voce - **4Marks**
- **iv)** Record (Practical file)- **3Marks**

II. There will be one sessions of 3 hours duration. The paper will have one session and 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 is to be allotted to more than three examinees in a group.

COURSE OBJECTIVES:

1	To acquaint and make the students understand the working principles of different optical instruments and relate them to the theoretical concepts of Interference, diffraction and polarization.
2	Gain precision in handling of optical instruments and in making accurate physical measurements using experimental uncertainty and limits

Course Contents:

1. To find the angle of prism by rotating telescope.
2. To find the refractive index of the glass prism using a spectrometer.
3. To find the refractive index of a transparent liquid using a hollow glass prism and spectrometer for given wavelength.
4. To study the variation of refractive index with wavelength of spectral line of mercury source and hence find the values of Cauchy's constant.
5. To measure the wavelength of sodium light by using Newton's rings apparatus.
6. To determine the wavelength of spectral line of mercury using diffraction grating.
7. To determine the wavelength of sodium light using plane diffraction grating.
8. To determine the resolving power of plane diffraction grating.
9. To measure an accessible distance between two points using a sextant.
10. To measure an inaccessible distance between two points using a sextant.
11. To find the magnification power of a telescope.
12. To find the specific rotation of sugar solution by Laurentz half shade polarimeter.

Reference Books:

1. Arora, C.L.: Practical Physics, S. Chand & Co.
2. Bhatia, T.S., Kaur, Gursharan and Singh, Iqbal: Practical Physics Vol. II, Vishal Publications

COURSE OUTCOMES: On completing the course, the students will be able to:

CO1	Understand the working of basic optical instruments.
CO2	Understand and differentiate between the different phenomenon related to light such as Interference, diffraction and polarization.
CO3	Gain precision in handling of optical instruments.
CO4	Understand the operating principle of certain optical instruments
CO5	Understand the applications of Interference, diffraction and polarization.

Semester – I
COURSE CODE: MHZ-111
COURSE TITLE: BIO-MATHEMATICS-I

Credit Hours/week: 2
LTP: 110
Theory Paper: 37
Internal Assessment: 13
Periods/week: 3 **Total Marks: 50**

Instructions for the Paper Setters:

1. There will be five sections.
2. Section A is compulsory and will be of 09 marks consisting of eight short answer type questions carrying 1.5 marks each covering the whole syllabus. The answer should not exceed 50 words. The candidate will have to attempt any 6 questions in this section.
3. Section B, C, D and E will be set from units I, II, III and IV respectively and will consists of two questions of 07 marks each from the respective units. The candidates are required to attempt one question from each of these sections. Each question in these sections should not have more than two sub-parts.

COURSE OBJECTIVES:

1	To enable the students understand the basic concept of function and limit.
2	To help the students to acquaint with the properties of Matrices.
3	To make the students aware about the differentiation of a various functions.
4	To correlate mathematical concepts with the Zoology.

UNIT-I

Functions: Domain and Range of a function, Graph of a function, Inverse functions, Exponential and logarithmic functions, Limit of functions, Algebraic computation of limits, Continuity of function at a point.

UNIT-II

Differentiation: Derivability and Derivative, Derivatives of standard functions, Formulae on derivative of sum, difference, product and quotient of functions, Chain rule. Derivative of trigonometric functions, exponential functions.

UNIT-III

Derivative of functions expressed in parametric form
Logarithmic differentiation, Derivative of higher order (upto 2^{nd} order)

UNIT-IV

Maxima and minima of a function of a single variable
Introduction to Partial Differentiation

Practicals:

1. Graphs of Trigonometric functions
2. Exponential function
3. Logarithmic function
4. Inverse functions
5. Hyperbolic functions
6. Polynomial functions

Recommended books:.

1. Batschelet E. (1971): Introduction to Mathematics for Life Scientist, Springer-Verlog, Berlin.
2. Shanti Naryan and P.K. Mittal (2011): Differential Calculus, S. Chand and Co. (New Delhi)

COURSE OUTCOMES:

CO-1	Understand the basic concept of function and limit.
CO-2	To acquaint with the properties of matrices.
CO-3	Solve the problems related to the differentiation of a various functions.
CO-4	Find out the maximum and minimum value of a function using derivatives.
CO-5	Correlate mathematical concepts with the Zoology.

Semester-I

COURSE CODE: BCEN-1123

COURSE TITLE: COMMUNICATIVE ENGLISH-I

[B.Sc. (Hons.)Physics, Chemistry, Zoology, Botany, Math, Computational Statistics & Data Analytics]

Credit Hours/week: 4
LTP: 211
Theory Paper: 60
Practical {Paper: 15
Internal Assessment: 25
Periods/week: 6 **Total Marks: 100**

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: 12 Marks
Section B: 30 Marks
Section C: 18 Marks

Section A

1. Fifteen (15) Questions on the usage of Preposition, Articles, and Change of Voice will be set. The students will be required to attempt any **12 questions.** **(12X1= 12 Marks)**

Section B

2. ONE question (with sub parts) based on Skills and Strategies development exercises in Unit-I and Unit-II of the prescribed text book *Making Connections* will be set.
(**12X1= 12marks**)

3. Five short answer type questions from Unit 1 and 2 of *Making Connections: A Strategic Approach to Academic Reading* will be set. The students will be required to attempt any three. **(3X2= 06 marks)**

4. Four Essay type question (Two from each unit) from Unit 1 and 2 of *Making Connections: A strategic Approach to Academic Reading* will be set. The students will be required to answer any two, choosing at least one from each unit. **(2X6= 12 marks)**

Section C

5. A Comprehension questions of an unseen passage will be set. **(1X6 = 6 marks)**

6. A question requiring the students to write **a Paragraph** on **ONE** of the **TWO** given topics. **(1X6 = 6 marks)**

7. A question requiring the students to write an **Official/Business Letter** on **one** of the **two** given Topics. **(1X6 = 6 marks)**

COURSE OBJECTIVES:

1	To develop competence in written communication.
2	To inculcate innovative and critical thinking among the students.
3	To enable them to grasp the application of communication theories.
4	To acquire the knowledge of latest technology related with communication skills.
5	To provide knowledge of multifarious opportunities in the field of this programme.

COURSE CONTENTS:

1. Reading and Comprehension Skills:

a. Reading tactics and strategies; Reading purposes–kinds of purposes and associated comprehension; Reading for direct meanings.
b. The Students will be required to read and comprehend the essays in Unit 1 and 2 of the book *Making Connections: A Strategic Approach to Academic Reading* by Kenneth J. Pakenham, Third Edition.

2. Writing Skills: Guidelines for effective writing; writing styles for paragraph and official/ business letter.

3. Grammar: Preposition, Articles, and Change of Voice.

Prescribed Books:
Making Connections by Kenneth J. Pakenham 3rd Edn. CUP

PRACTICAL (Marks: 15)
Course Contents:-
1. Reading dialogues (5 Marks)
2. Rapid reading (5 Marks)
3. Project File (5 Marks)

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: The completion of this course enables students to:

CO-1	Identify common errors in language and rectify them
CO-2	Develop and expand writing skills through controlled and guided activities
CO-3	Develop coherence, cohesion and competence in written discourse through intelligible pronunciation
CO-4	Develop the ability to handle the interview process confidently and learn the subtle nuances of an effective group discourse
CO-5	Communicate contextually in specific and professional situations with courtesy

KHALSA COLLEGE, AMRITSAR
(An Autonomous College)
P.G. Department of Zoology

Semester – I
COURSE CODE: BPBI-1101
COURSE TITLE: lwzmI pMjwbI (Punjabi Compulsory)

kRYift pRqI hPqw: 04
LTP:400
iQaUrI AMk: 75
ieMtrnl AsYsmYNt: 25

smW: 3 GMty **kul AMk: 100**

AMk-vMf Aqy pRIiKAk leI hdwieqW

islybs dy cwr Bwg hn pr pRSn-p`qr dy pMj Bwg hoxgy[ pihly Bwg ivc 1.5-1.5 (fyF-fyF) AMk dy Aiq-sMKyp (Objective Type) 10 pRSn pu`Cy jwxgy jo ik swry islybs ivcoN hoxgy Aqy swry pRSn h`l krny lwzmI hoxgy[ islybs dy bwkI cwr BwgW ivc 02-02 lyK numw pRSn pu`Cy jwxgy[hryk Bwg ivcoN 01-01 pRSn krnw lwzmI hovygw[hryk pRSn dy brwbr 15 AMk hoxgy[pypr sY~tr jykr cwhy qW pRSnW dI vMf A`gy v`D qoN v`D cwr aup-pRSnW ivc kr skdw hY[
not: ieMtrnl AsY~smYNt 25 AMkW dI hY[ies pypr dy ku`l AMk 75+25=100 hn[

kors dw audyS COURSE OBJECTIVES:

1	ividAwrQIAW ivc swihqk ruclAW pYdw krnw[
2	Awlocnwqmk ruclAW ivksq krnw[
3	mwq BwSw dI smJ ƒ ivksq krnw[

pwT-kRm

Bwg-pihlw

swihq dy rMg, fw. mihl isMG (sMpw.), rvI swihq pRkwSn, AMimRqsr[
Bwg pihlw - kivqw Aqy khwxI, fw. mihl isMG Aqy fw. Awqm rMDwvw (sih sMpw.)
(kivqw Bwg ivc pRsMg sihq ivAwiKAw/ivSw-vsqU[khwxI Bwg ivc swr/ivSw-vsqU)

Bwg-dUjw

pMjwb dy mhwn klwkwr (sMpw. blvMq gwrgI)
gurU nwnk dv XUnIvristI, AMimRqsr[
(AMimRqw Syrig`l qoN Bwel smuMd isMG qk)
(ivSw-vsqU/swr/nwiek ibMb)

Bwg-qIjw

(a) pYrHw rcnw (iqMnW ivc iek)
(A) pYrHw pVH k pRSnW dy auqr

Bwg-cOQw

(a) BwSw vngIAW: BwSw dw tkswlI rUp, BwSw Aqy aup-BwSw ivclw AMqr, pMjwbI aup-BwSwvW dy pCwx-icMnH[
(A) pMjwbI BwSw: inkws qy ivkws[

pwT-kRm nqIjy Course Outcomes (COs):

CO1	ividAwrQI dI swihqk soc-smJ ivksq hovygI[
CO2	ividAwrQI ivc swihq rcIAW ivksq hoxgIAW[
CO3	ividAwrQI nU swihq isrjxw dI sµBwvnw vDygI[
CO4	ividAwrQI iksy vI ivSy dw gihn AiDAYn krn dy kwbl hovygw[
CO5	auh pMjwbI BwSw dy inkws qy ivkws bwry igAwn hwsl krngy

Semester – I
COURSECODE: BPBI-1102
COURSETITLE: muFlI pMjwbI
(In Lieu of Compulsory Punjabi)

kRfft pRqI hPqw: 04
LTP: 400
iQaUrI AMk: 75
ieMtrnl AsYsmYt: 25
smW: 3 GMt **kul AMk: 100**

AMk–vMf Aq pRIiKAk Iel hdwieqw

islybs d cwr Bwg hn pr pRSn-p`qr d pMj Bwg hoxgy[ pihly Bwg ivc 01-01 Ak d Aiq-sMKyp au~qr vwly (Objective Type) 11 pRSn pUCy jwxgy jo ik swry islybs ivc hoxgy Aqy swry pRSn h`I krn lwzmI hoxgy[pRSn p`qr d dUsry Bwg ivc, islybs d pihly Bwg ivc iqMn pRSn pU`Cy jwxgy[ijMnHW ivc koeI d pSn h`I krn hoxgy[ hryk pRSn d brwbr 8-8 Ak hoxgy[ ies qrHW pRSn p`qr d qIsry Bwg ivc iqMn pRSn pU`Cy jwxgy ijMnHW ivc d pRSn h`I krny hoxgy[hryk pRSn d brwbr 8-8 AMk hoxgy[Bwg cOQy ivc pj pRSn pU`Cy jwxgy[ ijMnHW ivc cwr pSn hI krny hoxgy[ hryk pRSn d brwbr 4-4 Ak hoxgy[ Bwg pMjvyN ivc ds pRSn pU`Cy jwxgy[ijMnHW ivc 8 pRSn krny lwzmI hoxgy[hr pRSn d 2-2 AMk hoxgy[

not: ieMtrnl AsY~smYNt 25 AkW dI hY[ies pypr d kU`I AMk 75+25=100 hn[

kors dw audyS COURSE OBJECTIVE

1	ividAwrQI n gurmuKI ilpI qoN jwxU krwauxw[
2	ividAwrQI n Su`D pMjwbI pVHnw-ilKxw isKwauxw[
3	pMjwbI BwSw dIAW ivAwkrnk bwrIkIAW qoN jwxU krwauxw[
4	Su`D sMcwr n ivksq krnw[

pwT–kRm
Bwg–pihlw

(a) pMjwbI BwSw qy gurmuKI ilpI:

nwmkrx qy sMKyp jwx-pCwx: gurmuKI vrxmwlw, A`Kr kRm, svr vwhk (a, A, e), lgW-mwqrW, pYr ivc ibMdI vwly vrn, pYr ivc pYx vwly vrn, ibMdI, it`pI, ADk

(A) isKlwel qy AiBAws

Bwg–dUjw

gurmuKI AwrQogrwPI Aqy aucwrn:

svr, ivAjn: muFlI jwx-pCwx Aqy aucwrn, muhwrnI, lgW-mwqrW dI pCwx

Bwg–qIjw

pMjwbI Sbd-joV: mukqw (d A`KrW vwly Sbd, iqMn AKrW vwly Sbd), ishwrI vwly Sbd, ibhwrI vwlI Sbd, AONkV vwly Sbd, dulYNkV vwly Sbd, lW vwly Sbd, dulwvW vwly Sbd, hoVy vwly Sbd, knOVy vwlI Sbd, lgwKr (ibdI, it`pI, A`Dk) vwly Sbd

Bwg–cOQw

Suæ`D-ASu`D Sbd

pwT–kRm nqIjy Course Outcomes (COs):

CO1	ividAwrQI pMjwbI BwSw Aqy gurmuKI ilpI dI isKlwel ivc muhwrq hwisl krngy[
CO2	pMjwbI BwSw ivc muhwrnI, lgW-mwqrW, svr Aqy ivAMjn dI pCwx Aqy vrqoN duAwrw aunHW dI smJ n ivkisq hovygI[
CO3	ividAwrQI Su`D pMjwbI ilKx-pVHn d smr`Q hoxgy[
CO4	auh pMjwbI BwSw d ivAwkrn pRbMD dI jwxkwrI hwisl krngy[

Semester – I

COURSE CODE: BPHC-1104
COURSE TITLE: 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)

Credit Hours/week: 4
LTP: 400
Theory Paper: 75
Internal Assessment: 25
Periods/week: 6 **Total Marks: 100**

Instructions for the Paper Setters:

Question paper should consist of two sections—Section A and Section B. The paper setter must ensure that questions in Section–A do not cover more than one point, and questions in Section–B should cover at least 50 per cent of the theme.

Section–A: The examiner will set 15 objective type questions out of which the candidate shall attempt any 10 questions, each carrying 1½ marks. The total weightage of this section will be 15 marks. Answer to each question should be in approximately one to two sentences.

Section–B: The examiner will set 8 questions, two from each Unit. The candidate will attempt 4 questions selecting one from each Unit in about 1000 words. Each question will carry 15 marks. The total weightage of this section will be 60 marks.

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

COURSE OBJECTIVES: To

1	Educate the history and culture of the Ancient Punjab to the students who are not domicile of the Punjab.
2	Familiarize them with the physical features of ancient Punjab and its impact on its history and culture.
3	Provides information about the different sources to construct the history and culture of the ancient Punjab
4	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.
7. Teachings and impact of Buddhism.
8. Jainism in the Punjab.

Suggested Readings:-

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	Learn the history and culture of the Ancient Punjab.
CO-2	Study the Physical features of ancient Punjab
CO-3	Understand the sources of the history of the Punjab.
CO-4	Analyse the social, economic, religious life of the Harrapan civilization and Vedic-Aryans
CO-5	Teachings and impact of Jainism and Buddhism in the Punjab

Semester – I
COURSE CODE: ZDA-111
COURSE TITLE- Drug Abuse: PROBLEM OF DRUG ABUSE
(Compulsory for all Under Graduate Classes)

Credit Hours (per week): 2
LTP: 200
Periods/ week: 2 **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, "Drug Abuse Problem, Management & Prevention" (Punjabi version) 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.
1. Rama Gandotra and Randhawa, J.K. 2018. Drug Abuse-Management and Prevention (Punjabi version) KasturiLal & Sons, Educational Publishers, Amritsar- Jalandhar.
11. Sain, Bhim 1991, Drug Addiction Alcoholism, Smoking obscenity New Delhi: Mittal Publications.
12. Sandhu, Ranvinder Singh, 2009, Drug Addiction in Punjab: A Sociological Study. Amritsar: Guru Nanak Dev University.
13. Singh, Chandra Paul 2000. Alcohol and Dependence among Industrial Workers: Delhi: Shipra.
14. Sussman, S and Ames, S.L. (2008). Drug Abuse: Concepts, Prevention and Cessation, Cambridge University Press.
15. World Drug Report 2010, United Nations office of Drug and Crime.
16. 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.

Semester–II

COURSE CODE: ZHZ-121

COURSE TITLE: BIOLOGY OF NONCHORDATES-II

Credit Hours/week: 4
LTP: 310
Theory Paper: 75
Internal Assessment: 25
Periods/week: 6 **Total Marks: 50**

Instructions for the Paper Setters:

1. There will be five sections.
2. Section A is compulsory and will be of 15 marks consisting of eight short answer type questions carrying 2.5 marks each covering the whole syllabus. The answer should not exceed 50 words. The candidate will have to attempt any 6 questions in this section.
3. Section B, C, D and E will be set from units I, II, III and IV respectively and will consists of two questions of 15 marks each from the respective units. The candidates are required to attempt one question from each of these sections. Each question in these sections should not have more than two sub-parts.

COURSE OBJECTIVES: The paper aims to

1	Understand the animal kingdom.
2	Understand the origin and evolutionary relationships and taxonomic positions of phylum Arthropoda to Hemichordata.
3	Understand the general characteristics and body organization of animals belonging to Arthropoda to Hemichordata.

UNIT-I

- Arthropoda : Type study
  - *Palaemon malcolmsonii*
  - *Periplaneta Americana*
- Onychophora: (General characteristics and evolutionary significance)

UNIT-II

- Mollusca :Type study
  - *Pila*
  - *Unio*
- Significance of Torsion in Molluscs

UNIT-III

- Echinodermata :Type study
  - *Asterias* (Special reference to water vascular system)
- Study of Echinoderm larvae

UNIT-IV

- Hemichordata :
  - *Balanoglossus*
- Affinities of Hemichordates with non-chordates and chordates.

Books Recommended

1. Barnes, A., Invertebrate Zoology, Harcourt Publishers, International Company, 2001.

2. Chaudhry, S., Fundamental Invertebrate Zoology, S. Vikas & Co. Fatehpura, Jalandhar, 2003.
3. Dhami, P.S. and Dhami, J.K., Invertebrate Zoology, 5th ed., R. Chand & Co., New Delhi, 2004.
4. Kotpal, R.L., Modern Text Book of Zoology, Invertebrates, 10th ed., Rastogi Publications, Meerut, 2012.
5. Parker, T.J. and Haswell, W.A., Text book of Zoology, Invertebrates, 7th ed., Vol. I (eds. A.J. Marshall & W.D. Williams), CBS Publishers & Distributors, Delhi, 1992

COURSE OUTCOMES

CO-1.	The subject of non-chordates helps the students to know about the structural aspects of different animals
CO-2.	Students also gain knowledge about the taxonomies and evolutionary aspects of Zoology.
CO-3.	To study faunal diversity and learn to implement conservation measures to save biodiversity

Semester – II

COURSE CODE: ZHZ-122

COURSE TITLE: ZOOLOGY LAB-II

(Related to BHZ-201)

Credit Hours/week: 2
LTP: 002
Practical Paper: 37
Internal Assessment: 13
Periods/week: 6 **Total Marks: 50**

Important Note for Practical:

1. Candidates will be required to submit their original note books containing record of their laboratory work.
2. Wherever possible, students must be taken out for excursion to the field (Zoological gardens, sea shores, ponds and hill stations etc.) to study habitat and ecology of the animals.
3. As per the latest UGC guidelines the dissections may please be avoided. In no case an animal falling under the categories of wildlife protection act 1972 should be caught or dissected. The rules of the Prevention of cruelty to Animals act 1960 should be familiar to all who are teaching the Zoology courses.

COURSE OBJECTIVES: The paper aims to:

1	Understand the structure of invertebrates and classify them.
2	Understand the structure and function of digestive, reproductive & nervous system of Cockroach and Pila.
3	Understand the preparation of temporary slides.
4	Study permanent stained slides of animals from Arthropoda to Hemichordata.

PRACTICALS:

I	Classification up to orders and study of the specimens mentioned against each phylum with ecological note and economic importance if any	
	Arthropoda:	*Palaemon*, *Lobster*, *Cancer*, *Sacculina*, *Eupagurus*, *Lepas*, *Balanus*, *Cyclops*, *Daphnia*, *Peripatus*, *Lepisma*, *Periplaneta*, *Schistocerca*, *Poecilocerus*, *Gryllus*, *Mantis*, *Cicada*, *Forficula*, Dragonfly, Termite queen, Cimex, Epilachna, *Polistes*, *Apis*, *Bombyx*, *Pediculus*, *Julus*, *Scolopendra*, *Palamnaeus*, *Aranea* and *Limulus*, *Cypris*
	Mollusca:	*Anodonta*, *Mytilus*, *Pholas*, *Pecten*, *Haliotis*, *Aplysia*, *Doris*, *Limax*, *Pila*, *Sepia*, *Octopus*, *Nautilus*, *Chiton* and *Anodonta*
	Echinodermata:	*Asterias*, *Echinus*, *Cucumaria*, *Antedon*, *Ophiothrix*
II.	**Study of Permanent slides**	
	Arthropoda:	Trachea of insect, mouthparts of cockroach; Gill and statocyst of prawn
	Mollusca:	Glochidium larva, Veliger larva, radula and Osphradium of *Pila*
	Echinodermata:	T.S. of Star-fish arm and Bipinnaria larva
III.	**Study of systems through charts/models**	
	Peripaneta americana:	Digestive, Reproductive and Nervous system.
	Palaemon malcolmsonii:	Appendages and green gland.
	Pila:	Digestive and Nervous system

Guide lines for conduct of practical Examination:-

1.	Identify and classify the specimens A to D upto order level. Write a note on their habit, habitat, special features and economic importance.	12
2.	Identify the slides E to H and give two reasons for identification.	10
3.	Identify the systems by using models.	6
4.	Assignment	3
5.	Viva-voce & Practical file.	6

COURSE OUTCOMES:

CO-1.	Have a knowledge about all the different phyla of invertebrates
CO-2.	Understand the comparative structure of invertebrates
CO-3.	Have an insight about the microscopic life
CO-4.	Differentiate invertebrates on the basis of morphological characteristics

Semester–II

COURSE CODE: BHZ-121

COURSE TITLE: CRYPTOGAMS –II

Credit Hours/week: 4
LTP: 310
Theory Paper: 75
Internal Assessment: 25
Periods/week: 6 **Total Marks: 50**

Instructions for the Paper Setters:

1. There will be five sections.
2. Section A is compulsory and will be of 15 marks consisting of eight short answer type questions carrying 2.5 marks each covering the whole syllabus. The answer should not exceed 50 words. The candidate will have to attempt any 6 questions in this section.
3. Section B, C, D and E will be set from units I, II, III and IV respectively and will consists of two questions of 15 marks each from the respective units. The candidates are required to attempt one question from each of these sections. Each question in these sections should not have more than two sub-parts.

COURSE OBJECTIVES:

1	To acquaint students with basic concepts of diversity of Bryophytes and Pteridophytes
2	To study systematic Position, structure, and function of these plants.

Unit-I

- **Bryophytes:**
  - General characters, classification and economic importance
  - Bryophytes as amphibians of plant kingdom
  - Adaptive characters for land habitat displaying heterologous alternation of generations

Unit –II

- Study of morphology, anatomy, reproductive characters and life cycle of following:
  - **Hepaticopsida**: *Marchantia*
  - **Anthocerotopsida:** *Anthoceros*
  - **Bryopsida:***Funaria*

Unit- III

- **Pteridophytes:**
  - General characters, classification and economic importance
  - The first vascular plants
  - Stelar system in Pteridophytes
  - Heterospory and seed habit, apogamy and apospory

Unit - IV

- Study of morphology, anatomy, reproductive characters and life cycle of following:
  - **Psilophyta**: *Psilotum*
  - **Lycophyta***: Lycopodium*
  - **Sphenophyta:** *Equisetum*
  - **Pterophyta:***Pteris*

Suggested Readings:

1. Bryophyta. S. Chand & Company Ltd, New Delhi.
2. Parihar, N.S. 1991. Bryophytes. Central Book Depot, Allahabad.
3. Parihar, N.S. 1996. The Biology and Morphology of Pteridophytes. Central Book Depot, Allahabad.
4. Puri, P. 1980. Bryophyta. Atma Ram and Sons. Delhi.
5. Richardson, D.H.S. 1981 The Biology of Mosses. John Wiley and Sons, New York.
6. Sambamurty 2008 A Textbook of Bryophytes, Pteridophytes, Gymnosperms and Paleobotany. IKInternational Publishers.
7. Shaw, A.J. and Goffinet, B. (2000) Bryophyte Biology. Cambridge University Press.
8. Vander-Poorteri 2009 Introduction to Bryophytes. COP.
9. Vashishta, B. R., A. K. Sinha and Adarsha Kumar. 2008. Botany for Degree Students:
10. Vashishta, B. R., A. K. Sinha and V. P. Singh. 2008. Botany for Degree Students: Algae.S. Chand & Company Ltd, New Delhi.

COURSE OUTCOMES:

CO-1	This course makes student aware about the diversity in various life forms of plant kingdom
CO-2	It enables students to identify Bryophytes and Pteridophytes.
CO-3	It is the basis of advanced study in botany.
CO-4	It enables students to differentiate structural differences.

Semester–II

COURSE CODE: BHZ-122

COURSE TITLE: BOTANY LAB-II (Cryptogams-II)

Credit Hours/week: 2
LTP: 002
Theory Paper: 37
Internal Assessment: 13
Periods/week: 6 **Total Marks: 50**

COURSE OBJECTIVES: The paper aims to

1	Study the morphology of Bryophytes and Pteridophytes.
2	Study reproductive structures of Bryophytes and Pteridophytes.

1. Study of morphology, anatomy and reproductive structures of various genera of bryophytes:
   - **Hepaticopsida**: *Marchantia*
   - **Anthocerotopsida:** *Anthoceros*
   - **Bryopsida:***Funaria*
2. Study of morphology, anatomy and reproductive structures of various genera of Pteridophytes:
   - **Psilophyta**: *Psilotum*
   - **Lycophyta***: Lycopodium*
   - **Sphenophyta:** *Equisetum*
   - **Pterophyta:***Pteris*
3. Study of some Pteridophytes in their natural habitat.

COURSE OUTCOMES:

CO-1.	To understand the external structure of Bryophytes and Pteridophytes.
CO-2.	To study reproductive structures along with life cycle

Semester-II

COURSE CODE: PHU-121

COURSE TITLE: MODERN PHYSICS

Credit Hours/week: 4
LTP: 300
Theory Paper: 56
Internal Assessment: 19
Periods/week: 6 **Total Marks: 75**

Instructions for the Paper Setters:

1. There will be five sections.
2. Section A is compulsory and will be of 12 marks consisting of eight short answer type questions carrying 2 marks each covering the whole syllabus. The answer should not exceed 50 words. The candidate will have to attempt any 6 questions in this section.
3. Section B, C, D and E will be set from units I, II, III and IV respectively and will consists of two questions of 11 marks each from the respective units. The candidates are required to attempt one question from each of these sections. Each question in these sections should not have more than two sub-parts.

COURSE OBJECTIVES:

1	To gain theoretical knowledge and an in depth understanding of atoms, elementary particles, radioisotopes and radiation.
2	To understand various techniques related to radioisotope.

UNIT-I

Atomic Structure: Structure of Atom, Rutherford Scattering, Impact parameter, Distance of closest approach, Nucleus and its properties, The Bohr model of atom, Electron orbits, Energy levels and Hydrogen spectra, Bohr's correspondence principle, Atomic excitation, Franck Hertz experiment, Introduction to Lasers, Einstein's coefficients, He-Ne Laser.

UNIT-II

Radioisotopes and their Application: Radioactivity, Radioactive decay laws, Uranium and Carbon dating, α, β and γ decays and their properties, Radioisotopes, their production and separation, Uses of radioisotopes in medicine, agriculture and geology, Radiation doses and their units, Biological effects of radiation.

UNIT-III

Dual Nature of Matter and Radiation: Planck's quantum hypothesis, de Broglie's hypothesis, Electron diffraction experiments of Davisson and Germen, Wave group and particle velocities, Heisenberg's uncertainty principle, Principle of the electron microscope, Diffraction of X-rays from crystals, , Bragg's law of diffraction.

UNIT-IV

Elementary Particles: Classification of elementary particles and their properties, Antiparticles, Conservation laws (qualitative only), Uses of ionization chamber, G.M. Counter, Scintillation counter and Photographic emulsions as detectors, Origin and general characterization of cosmic rays (Primary and Secondary).

Reference Books:

1. Acosta, V. and Grown, C. L., Essentials of Modern Physics

2. Beiser, A. Concepts of Modern Physics
3. Duggal, B. D. and Chhabra, C. L., Fundamentals of Modern Physics

COURSE OUTCOMES: On completing the course, the students will be able to:

CO-1	Gain knowledge about atomic structure.
CO-2	Acquire in depth understanding of properties of light like atoms, elementary particles, radioisotopes and radiation.
CO-3	Understand the applications of various techniques related to radioisotope

Semester-II

COURSE CODE: PHU-122

COURSE TITLE: PHYSICS LAB-II

Credit Hours/week: 1
LTP: 001
Theory Paper: 19
Internal Assessment: 06
Periods/week: 3 **Total Marks: 25**

General Guidelines for Practical Examination

I. The distribution of marks is as follows:
- **i)** One experiment- **09Marks**
- **ii)** Brief Theory**- 3Marks**
- **iii)** Viva–Voce - **4Marks**
- **iv)** Record (Practical file)- **3Marks**

II. There will be one sessions of 3 hours duration. The paper will have one session and 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 is to be allotted to more than three examinees in a group.

COURSE OBJECTIVES:

1	To acquaint and make the students understand the working principles of various instruments and relate them to the theoretical concepts of spectrum, ionization and radioactivity.
2	Gain precision in handling of spectrophotometer, potentiometer and GM counter and in making accurate physical measurements using experimental limits

CONTENT

1. To study the gas discharge spectrum of hydrogen.
2. To study the absorption spectra of iodine vapours.
3. To determine the ionization potential of mercury.
4. To study the photoelectric effect and determine the value of Planck's constant.
5. Study of variation of light intensity with distance using photovoltaic cell (Inverse Square Law).
6. To draw the plateau of a GM counter and find the operating voltage of GM tube.
7. To find the dead time of GM counter.
8. To study the absorption coefficient beta particles in aluminium using GM counter and find the absorption coefficients.
9. To study the statistical fluctuations and end point energy of beta particles using GM counter.
10. Measurement of reverse saturation current in pn junction diode at various temperatures and find the approximate value of the band gap.
11. To determine the wavelength of He-Ne laser using plane diffraction grating.

Reference Books:

1. Arora, C.L. Practical Physics, S. Chand & Co.

2. Bhatia, T.S., Kaur, Gursharan and Singh, Iqbal: Practical Physics Vol. II, Vishal Publications.

COURSE OUTCOMES: On completing the course, the students will be able to:

CO1	Understand the working of basic spectometers.
CO2	Understand and differentiate between the different phenomenon related to absorbtion spectrum and gas discharge spectrum.
CO3	Gain precision in handling of GM counter.
CO4	Understand the operating principle of Plank's constant.

Semester-II

COURSE CODE: MHZ-121

COURSE TITLE: BIO-MATHEMATICS-II

Credit Hours/week: 2
LTP: 110
Theory Paper: 25
Practical: 12
Internal Assessment: 13
Periods/week: 4+2=6 **Total Marks: 50**

Instructions for the Paper Setters:

1. There will be five sections.
2. Section A is compulsory and will be of 5 marks consisting of eight short answer type questions carrying 1 mark each covering the whole syllabus. The answer should not exceed 50 words. The candidate will have to attempt any 5 questions in this section.
3. Section B, C, D and E will be set from units I, II, III and IV respectively and will consists of two questions of 5 marks each from the respective units. The candidates are required to attempt one question from each of these sections. Each question in these sections should not have more than two sub-parts.

COURSE OBJECTIVES:

1	To enable the students understand the basic concept of integration and differentiation.
2	To help the students to acquaint with the properties of Statistics.
3	To make the students aware about the Differential equation.
4	To correlate mathematical concepts with the Zoology.

Section -A

Integration as inverse of differentiation. Indefinite integral of standard forms. Integration by parts. Integration by substitution.

Integration using method of partial fractions (of algebraic rational functions).

Definite integral and application in finding the area under simple curves, especially lines, arcs of circles (in standard form only).

Section-B

Statistics: Concept of Probability, Random Experiments: outcomes, sample spaces (Set Representation), Additive and Multiplication law of Probability, Independent Events, Conditional probability. Permutations and Combinations, standard deviation and skewness.

Differential Equations: Definition, Solution of differential equations of first order and first degree (Variable separable, homogeneous equations, linear equations and equations reducible to the linear form). Applications of first order differential equations to biology.

Practicals: 12 Marks

Graphs of simple curves, circles and lines.

Experiments on probability theory, random experiments:- outcomes, sample space along with practical examples.

Recommended books:

1. Bailey, N.T.J.(1995): Statistical Methods in Biology, Cambridge University Press.
2. Gupta S.P. (2000): Statistical methods. Sultan Chand and Company, New Delhi.

3. Kapoor V.K. and Gupta S.C. (2000): Fundamentals of Mathematical Statistics. Sultan Chand and Company, New Delhi.
4. Shanti Naryan and P.K. Mittal(2011): Integral Calculus, S. Chand and Co. (New Delhi)

COURSE OUTCOMES:

CO-1	Understand the basic concept of integration and differentiation.
CO-2	To acquaint with the properties of Statistics.
CO-3	Solve the problems related to the Differential equation.
CO-4	Correlate mathematical concepts with the Zoology.

Semester- II
COURSE CODE: BCEN-1223
COURSE TITLE: COMMUNICATIVE ENGLISH-II

Credit Hours/week: 4
LTP: 211
Theory Paper: 60
Practical Paper: 15
Internal Assessment: 25
Periods/week: 6 **Total Marks: 100**

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: 12 Marks
Section B: 30 Marks
Section C: 18 Marks

Section A

1. Fifteen (15) Questions on the usage of Preposition, Articles, and Change of Voice will be set. The students will be required to attempt any **12 questions.** **(12X1= 12 Marks)**

Section B

2. ONE question (with sub parts) based on Skills and Strategies development exercises in Unit-I and Unit-II of the prescribed text book *Making Connections* will be set.
(**12X1= 12marks**)

3. Five short answer type questions from Unit 1 and 2 of *Making Connections: A Strategic Approach to Academic Reading* will be set. The students will be required to attempt any three. **(3X2= 06 marks)**

4. Four Essay type question (Two from each unit) from Unit 1 and 2 of *Making Connections: A strategic Approach to Academic Reading* will be set. The students will be required to answer any two, choosing at least one from each unit. **(2X6= 12 marks)**

Section C

5. A Comprehension questions of an unseen passage will be set. **(1X6 = 6 marks)**

6. A question requiring the students to write **a Paragraph** on **ONE** of the **TWO** given topics. **(1X6 = 6 marks)**

7. A question requiring the students to write an **Official/Business Letter** on **one** of the **two** given Topics. **(1X6 = 6 marks)**

COURSE OBJECTIVES:

1	To develop competence in oral and visual communication
2	To inculcate innovative and critical thinking among the students
3	To enable them to grasp the application of communication theories
4	To acquire the knowledge of latest technology related with communication skills
5	To provide knowledge of multifarious opportunities in the field of this programme

COURSE CONTENTS

1. Reading and Comprehension Skills:
Students will be required to read and comprehend the essays in Unit 3 and 4 of the book

Making Connections: A Strategic Approach to Academic Reading by Kenneth J. Pakenham, Third Edition.

2. Speaking and Conversational Skills: Components of a meaningful and easy conversation; understanding the cue and making appropriate responses; asking and providing information on general topics, situation based Conversation in English.

3. Grammar: Tenses, Conjunctions, and Subject-Verb Agreement.

Prescribed Books:
Making Connections by Kenneth J. Pakenham 3rd Edn. CUP

PRACTICAL (Marks 15)
Course Contents:-
1. Oral Presentation. (5 Marks)
2. Group Discussion. (5 Marks)
3. Mock Interview (5 Marks)

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

CO 1	Identify common errors in language and rectify them
CO 2	Develop and expand writing skills through controlled and guided activities
CO 3	Develop coherence, cohesion and competence in oral discourse through intelligible pronunciation
CO 4	Develop the ability to handle the interview process confidently and learn the subtle nuances of an effective group discourse
CO 5	Communicate contextually in specific and professional situations with courtesy

Semester – II

COURSE CODE: BHPB-1201

COURSE TITLE: PUNJABI-II lwzmI pMjwbI

kRfft pRqI hPqw: 04
LTP: 400
iQaUrI AMk: 75
ieMtrnl Asesmt: 25
smW: 3 GMt **kl AMk: 100**

AMk-vMf Aq pRIiKAk lel hdwieqW

islybs d cwr Bwg hn pr pRSn-p`qr d pMj Bwg hoxgy[ pihly Bwg ivc 1.5-1.5 (fyF-fyF) AMk d Aiq-sMKyp (Objective Type) 10 pRSn puCy jwxgy jo ik swry islybs ivc hoxgy Aqy swry pRSn h`l krn lwzmI hoxgy[islybs d bwkI cwr BwgW ivc 02-02 lyK numw pRSn puCy jwxgy[hryk Bwg ivc 01-01 pRSn krnw lwzmI hvygw[hryk pRSn d brwbr 15 Ak hoxgy[pypr sY~tr jykr cwh qW pRSnW dI vMf A`qoN v`D q vD cwr aup-pSnW ivc kr skdw hY[
not: ieMtrnl AsY~smYNt 25 AMkW dI hY[ies pypr d ku`l AMk 75+25=100 hn[

kors dw audyS COURSE OBJECTIVES:

1	ividAwrQIAW ivc swihqk rucIAW pYdw krnw[
2	Awlocnwqmk rucIAW ivksq krnw[
3	ividAwrQI n d&qrI Aqy GryIU ic`TI p`qr qoN jwxU krvwauxw[
4	BwSwel igAwn ivc vwDw krnw[

pwT-kRm

Bwg-pihlw

swihq dy rMg, fw. mihl isG (sMpw.), rvI swihq pRkwSn, AMimRqsr[
Bwg djw - vwrqk Aqy ryKw-ic`qr, fw. primMdr isMG, fw. BuipMdr isMG Aqy fw. kIdIp isMG iF`lI (sih sMpw.)
(vwrqk Bwg ivc swr/ivSw-vsqU[ryKw-ic`qr Bwg ivc swr/nwiek ibMb)

Bwg-dUjw

pMjwb dy mhwn klwkwr (sMpw. blvMq gwrgI)
gurU nwnk dv XUnIvristI, AMimRqsr[
(sqIS gujrwl qoN suirMdr kr qk)
(ivSw-vsqU/swr/nwiek ibMb)

Bwg-qIjw

(a) d&qrI ic`TI p`qr
(A) muhwvry Aqy AKwx

Bwg-cOQw

(a) Sbd-bxqr Aqy Sbd-rcnw - pirBwSw Aqy muFly sMkIp
(A) Sbd-SRyxIAW

pwT-kRm nqIjw Course Outcomes (COs):

CO1	aus Adr swihqk rucIAW pPuil~q hoxgIAW[
CO2	aus Adr swihq isrjxw dI sµBwvnw vDygI[
CO3	ividAwrQI ic`TI-p`qr dI ilKx SYlI qoN jwxU hovgw[
CO4	auh BwSwel bxqr qoN jwxU hovygw[

Semester – II

COURSE CODE: BPBI-1202

COURSE TITLE: BASICPUNJABI-II muFlI pMjwbI

(In Lieu of Compulsory Punjabi)

kRfft pRqI hPqw: 04
LTP: 400
iQaUrI AMk: 75
ieMtrnl AsYsmYt: 25
kul AMk: 100

smW: 3 GMt

AMk–vMf Aq pRIiKAk Iel hdwieqw

islybs d cwr Bwg hn pr pRSn-p`qr d pMj Bwg hoxgy[ pihly Bwg ivc 01-01 Ak d Aiq-sMKyp au~qr vwly (Objective Type) 11 pRSn puCy jwxgy jo ik swry islybs ivc hoxgy Aqy swry pRSn h`I krn lwzmI hoxgy[pRSn p`qr d dUsry Bwg ivc, islybs d pihly Bwg ivc iqMn pRSn puCy jwxgy[ ijMnHW ivc koeI d pSn h`I krn hoxg[hryk pRSn d brwbr 8-8 Ak hoxgy[ies qrHW pRSn p`qr d qIsry Bwg ivc iqMn pRSn puCy jwxgy ijMnHW ivc d pSn h`I krn hxgy[hryk pRSn d brwbr 8-8 Ak hoxgy[Bwg cOQy ivc pj pRSn puCy jwxgy[ijMnW ivc cwr pRSn h`I krny hoxgy[hryk pRSn d brwbr 4-4 Ak hoxgy[Bwg pMjvI ivc iqMn pRSn puCy jwxgy[ijMnHW ivc d pRSn krny lwzmI hoxgy[hryk pRSn d brwbr 8-8 AMk hoxgy[

not: ieMtrnl AsY~smYNt 25 AkW dI hY[ies pypr d kU`I AMk 75+25=100 hn[

kors dw audyS COURSE OBJECTIVES:

1	ividAwrQI AMdr Sbd bxqr dI smJ ivksq krnw[
2	ividAwrQI n Sbd pRkwr bwry jwxkwrI pdwn krnw[
3	pMjwbI BwSw d ivAwkrnk pRbMD sMbMDI igAwn krwauxw[
4	sKlweI qy AiBAws duAwrw pMjwbI Sbd BMfwr vDwauxw[

pwT–kRm

Bwg–pihlw

pMjwbI Sbd-bxqr:

DwqU, vDyqr (Agyqr, mDyqr, ipCyqr), pMjwbI koSgq Sbd Aqy ivAwkrnk Sbd

Bwg–dUjw

pMjwbI Sbd-pkwr:

(a) sMXkq Sbd, smwsI Sbd, djwqI Sbd, dohry/duhrukqI Sbd Aq imSrq Sbd

(A) isKlweI qy AiBAws

Bwg–qljw

pMjwbI Sbd-rcnw:

iek-vcn/bh-vcn, ilMg-puilMg, bhuArQk Sbd, smwnArQk Sbd, bhuqy SbdW Iel iek Sbd, Sbd jt, ivroDArQk Sbd, smnwmI Sbd

Bwg–cOQw

in`q vrqoN dI pMjwbI Sbdwvl

Kwx-plx, swkwdwrI, ru`qW, mhlinAW, igxqI, mOsm, bjæwr, vpwr, DMidAW nwl sMbMiDq

pwT–kRm nqljw Course Outcomes (COs):

CO1	auh pMjwbI Sbd-bxqr dI jwxkwrI hwsl krk BwSweI igAwn n ivkisq krngy[
CO2	pMjwbI Sbd-rcnw sMbMDI muhwrq hwsl krngy[
CO3	ividAwrQI SbdW dIAW iBMn-iBMn iksmW qoN jwxU hovgw[
CO4	ividAwrQIAW 'c in`q vrqoN dI pMjwbI Sbdwvl BMfwr 'c vwDw hvygw[

Semester – II

COURSE CODE: BPHC-1204

COURSE TITLE: PUNJAB HISTORY & CULTURE (C 321 TO 1000 A.D.)

(Special Paper in lieu of Punjabi comp.) (For those students who are not domicile of Punjab)

Credit Hours (per week): 04
LTP: 400
Theory: 75
Internal Assessment: 25
Time: 3 Hours **Total. Marks: 100**

Instructions for the Paper Setters:

Question paper should consist of two sections—Section A and Section B. The paper setter must ensure that questions in Section–A do not cover more than one point, and questions in Section–B should cover at least 50 per cent of the theme.

Section–A: The examiner will set 15 objective type questions out of which the candidate shall attempt any 10 questions, each carrying 1½ marks. The total weightage of this section will be 15 marks. Answer to each question should be in approximately one to two sentences.

Section–B: The examiner will set 8 questions, two from each Unit. The candidate will attempt 4 questions selecting one from each Unit in about 1000 words. Each question will carry 15 marks. The total weightage of this section will be 60 marks.

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

COURSE OBJECTIVES: The course aim is to

1	Educate the students who are not domicile of the Punjab about the history and culture of the Ancient Punjab.
2	Provide knowledge about the social, economic, religious, cultural and political life of the people of the Punjab during the rule of various dynasties of the period under study.

Unit-I

1. The 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: 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, Language, literature, art and architecture of Ancient Punjab from 7th century to1000AD. CO

Semester-II
Course Code: ZDA-121
Course Title-DRUG ABUSE: PROBLEM, MANAGEMENT AND PREVENTION
DRUG ABUSE: MANAGEMENT AND PREVENTION
(Compulsory for all Under Graduate Classes)

Credit Hours (per week): 02
LTP: 200
Time: 3 Hours **Total. 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:

2. Extent, Pattern and Trend of Drug Use in India, Ministry of Social Justice and Empowerment, Government of India, 2004.
3. Gandotra, R. and Randhawa, J.K. 2018. Drug Abuse-Management and Prevention (Punjabi version) KasturiLal & Sons, Educational Publishers, Amritsar- Jalandhar.
4. Inciardi, J.A. 1981. The Drug Crime Connection. Beverly Hills: Sage Publications.

5. Modi, Ishwar and Modi, Shalini (1997) Drugs: Addiction and Prevention, Jaipur: Rawat Publication.
6. Randhawa, J.K. and Randhawa, Samreet 2018. Drug Abuse-Management and Prevention. Kasturi Lal & Sons, Educational Publishers, Amritsar- Jalandhar.
7. Sain, Bhim 1991, Drug Addiction Alcoholism, Smoking obscenity New Delhi: Mittal Publications.
8. Sandhu, Ranvinder Singh, 2009, Drug Addiction in Punjab: A Sociological Study. Amritsar: Guru Nanak Dev University.
9. 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.