FACULTY OF SCIENCES

SYLLABUS FOR THE SESSION 2023 -24

Programme Code: BA

Programme Name: B.A.

(Subject: Mathematics and Statistics)
(Semester I-II)

Examinations: 2023-2024

P.G.Department of Mathematics
Khalsa College, Amritsar

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(b) Subject to change in the syllabi at any time.
(c) Please visit the College website time to time.

Syllabus of Mathematics

Semester-I										
Course Code	**Course Name**	**Credits**			**Total Credits**	**Max Marks**				**Page No.**
		L	**T**	**P**		**Th**	**P**	**IA**	**Total**	
MAT-111A	Algebra	4	0	-	4	75	-	25	100	**3-4**
MAT-111B	Calculus and Trigonometry	4	0	-	4	75	-	25	100	**5-6**
Total		8	-	-	8	150		50	200	

Semester-II										
Course Code	**Course Name**	**Credits**			**Total Credits**	**Max Marks**				**Page No.**
		L	**T**	**P**		**Th**	**P**	**IA**	**Total**	
MAT-121A	Calculus and Differential equations	4	0	-	4	75	-	25	100	**7-8**
MAT-121B	Calculus	4	0	-	4	75	-	25	100	**9-10**
Total		8	-	-	8	150		50	200	

Khalsa College, Amritsar

(An Autonomous College)
Syllabus for
PROGRAMME: B.A.
SEMESTER–I
MATHEMATICS
COURSE CODE: MAT-111A
COURSE TITLE: Algebra

CREDIT HOURS(PER WEEK): 4
TOTAL HOURS: 60 hrs.
Time: 3 Hours   **MAXIMUM MARKS: 100**
         Medium: English   **(THEORY :75 ,**
                              INTERNAL ASSESMENT:25)

         L-T-P :4-0-0

INSTRUCTIONS FOR PAPER SETTERS:

1. The question paper will consists 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. Section–A will consists of eight short answer type questions, each of 2.5 marks. Students are to attempt any six.
3. Sections–B, C, D& E will consist of two questions each **(each question should be sudivided into atmost two parts)**. Students are to attempt any four questions in total by selecting one question from each section. Each question carries 15 marks.
4. Teaching time for this paper would be six periods per week

COURSE OBJECTIVES:

- Students will be able to solve problems based on matrix algebra, vector spaces, eigen values and eigen vectors, Cardon's and Descarte's methods of solving a system of equations and inequalities.

COURSE CONTENT:

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.

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BOOKS PRESCRIBED:
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:
- solve problems based on matrices, vector spaces, eigen values and eigen vectors,
- recognize consistency and inconsistency of linear equations.
- Understand the relation between roots and coefficients.

Khalsa College, Amritsar

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Syllabus for
PROGRAMME: B.A.
SEMESTER–I
MATHEMATICS
COURSE CODE:MAT-111B
COURSE TITLE: Calculus and trigonometry

CREDIT HOURS(PER WEEK): 4
TOTAL HOURS: 60 HRS.
MAXIMUM MARKS: 100

Medium: English   **(THEORY :75 ,**
INTERNAL ASSESMENT:25)

Time: 3 Hours   **L-T-P :4-0-0**

INSTRUCTIONS FOR PAPER SETTERS:

1. The question paper will consists 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. Section–A will consists of eight short answer type questions, each of 2.5 marks. Students are to attempt any six.
3. Sections–B, C, D& E will consist of two questions each **(each question should be sudivided into atmost two parts)**. Students are to attempt any four questions in   total by selecting one question from each section. Each question carries 15 marks.
4. Teaching time for this paper would be six periods per week

COURSE OBJECTIVES:

*   Calculus has widespread applications in science, economics, and engineering and can solve many problems for which algebra alone is insufficient.
*   Trigonometry is a branch of mathematics that studies relationships between side lengths and angles of triangles.
*   Students will apply calculus and Trigonometry in areas such as geodesy, surveying, celestial mechanics, and navigation.
*   Students will learn relationships to other branches of mathematics, in particular complex numbers, infinite series, logarithms and calculus.

COURSE CONTENT:

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.

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Unit-IV

Exponential and Logarithmic function of complex numbers, Expansion of trigonometric functions, Gregory's series, Summation of series.

BOOKS PRESCRIBED:
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:
- understand the relationships between side lengths and angles of triangles.
- understand Calculus as a major part of contemporary mathematics education.
- Have knowledge in applications in science, economics, and engineering and students can solve many problems for which algebra alone is insufficient.
- Calculate the limit and examine the continuity of a function at a point.
- Develop intricate relationships to other branches of mathematics, in particular complex numbers, infinite series, logarithms and calculus.

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Syllabus for
PROGRAMME: B.A.
SEMESTER–II
MATHEMATICS
COURSE CODE: MAT-121A
COURSE TITLE: Calculus and differential equations

CREDIT HOURS(PER WEEK) : 4
TOTAL HOURS: 60 HRS

Medium: English   **Maximum Marks: 100**
Time: 3 Hours

(THEORY :75
,INTERNAL ASSESMENT:25)

L-T-P :4-0-0

INSTRUCTIONS FOR PAPER SETTERS:
1. The question paper will consists 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. Section–A will consists of eight short answer type questions, each of 2.5 marks. Students are to attempt any six.
3. Sections–B, C, D& E will consist of two questions each **(each question should be sudivided into atmost two parts)**. Students are to attempt any four questions in   total by selecting one question from each section. Each question carries 15 marks.
4. Teaching time for this paper would be six periods per week
.

COURSE OBJECTIVES:
- Calculus is a branch of mathematics focused on limits, functions, derivatives, integrals, and infinite series.
- 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.
- A differential equation is a mathematical equation that relates some function with its derivatives.
- 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.

COURSE CONTENT:

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

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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).

BOOKS PRESCRIBED:
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: On completing the course, the students will be able to:
- acquaint with the limits, functions, derivatives, integrals, and infinite series.
- associate Differential equations with the Mathematical modeling.
- solve multifarious differential equation that relates functions with its derivatives.
- know about concavity and convexity of the functions, Asymptotes and multiple points of a curve.
- Have knowledge about applications in fields of engineering, physics, economics, and biology.

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Khalsa College, Amritsar

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Syllabus for
PROGRAMME: B.A.
SEMESTER–II
MATHEMATICS
COURSE CODE: MAT-121B
COURSE TITLE: Calculus

CREDIT HOURS (PER WEEK) : 4
TOTAL HOURS: 60 hrs.
MAXIMUM MARKS: 100
TIME: 3Hrs   **(THEORY :75 , INTERNAL ASSESMENT:25)**

MEDIUM: English

L-T-P :4-0-0

INSTRUCTIONS FOR PAPER SETTERS:

1. The question paper will consists 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. Section–A will consists of eight short answer type questions, each of 2.5 marks. Students are to attempt any six.
3. Sections–B, C, D& E will consist of two questions each **(each question should be sudivided into atmost two parts)**. Students are to attempt any four questions in   total by selecting one question from each section. Each question carries 15 marks.
4. Teaching time for this paper would be six periods per week

COURSE OBJECTIVES:

• This course introduces the concept of partial derivatives which are used in fields such as computer graphics, physical sciences, vector calculus and engineering.
• Evaluate double and triple integrals of functions of several variables. Apply them in evaluating area and volume of solids.
• This course covers the concepts of jacobians, maxima and minima of functions of two variables, envelopes and evolutes.

COURSE CONTENT:

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.

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Unit-IV

Applications to evaluation of Areas, Volumes, Surfaces of solid of revolution.

BOOKS PRESCRIBED:
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: On completing the course, the students will be able to:
- apply Calculus in various fields such as computer graphics, physical sciences, economics and engineering.
- use Calculus in oceanography to calculate the height of tides in oceans.
- understand concept of partial derivatives which are used in fields such as computer graphics, physical sciences, vector calculus and engineering.
- learn about evaluating double and triple integrals of functions of several variables and apply them in evaluating area and volume of solids.
- Understand the concepts of jacobians, maxima and minima of functions of two variables, envelopes and evolutes.

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Syllabus of Statistics

Semester-I									
Course Code	**Course Name**	**Credits**			**Total Credits**	**Max Marks**				**Page No.**
		L	**T**	**P**		**Th**	**P**	**IA**	**Total**	
STA-111A	Statistical Methods–I	3	0	-	3	56	-			**12-13**
STA -111B	Probability Theory	3	0	-	3	56	-	50	200	**14-15**
STA -111P	Practical based on Paper: Statistical Methods-I	0	-	2	2	38	-			**16**
Total		06	0	02	08	150		50	200	

Semester-II									
Course Code	**Course Name**	**Credits**			**Total Credits**	**Max Marks**				**Page No.**
		L	**T**	**P**		**Th**	**P**	**IA**	**Total**	
STA-121A	Statistical Methods–II	3	0	-	3	56	-			**17-18**
STA -121B	Probability Distributions	3	0	-	3	56	-	50	200	**19-20**
STA -121P	Practical based on Papers: Statistical Methods-II and Probability Distributions	0	-	2	2	38	-			**21**
Total		06	0	02	08	150		50	200	

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Syllabus for
PROGRAMME: B.A.
Semester-I
COURSECODE: STA-111A

COURSE TITLE: PAPER–I: Statistical methods–I

CREDIT HOURS (PER WEEK): 3
TOTAL HOURS: 45 hrs
Medium: English   **MAXIMUM MARKS: 56**

Time: 3 Hours   **L-T-P :3-0-0**

INSTRUCTIONS FOR THE PAPER SETTERS:

1. The question paper will consists 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. Section–A will consists of eight short answer type questions, each of 2 marks. Students are to attempt any six.
3. Sections–B, C, D & E will consist of two questions each(**each question should be sudivided into atmost two parts**). Students are to attempt any four questions in total by selecting one question from each section. Each question carries 11 marks.
4. Teaching time for this paper would be FOUR periods per week.
5**. Non-Programmable Scientific calculator is allowed**.

COURSE OBJECTIVES:

- Students will be able to solve Statistical problems using various measure of central tendency.
- It enables the students to collect the data and present it diagrammatically.
- Students will learn the meaning and scope of Statistics.

COURSE CONTENTS:

Unit-I

Meaning and scope of statistics, Collection of data, presentation of data, diagrammatic representation of data. Attributes and variables, discrete and continuous frequency distribution of a variable, graphical representation of frequency distribution of a variable.

Unit-II

Central tendency: Measures of central tendency, namely, Arithmetic mean, median, mode, Geometric mean, Harmonic mean and their comparisons with an ideal measure of central tendency.

Unit-III

Dispersion and its measures, range, mean deviation, quartile deviation and standard deviation. Advantages of standard deviation as measure of dispersion over the other measures, Relative measures of dispersion, coefficient of variation.

Unit-IV

Central and non–central moments, central–moments expressed in terms of moments about an arbitrary origin and vice-versa. Sheppard's correction for moments. Skewness and its measures, Kurtosis and its measures.

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BOOKS PRESCRIBED:-

1. Gupta, S.C. and Kapoor, V.K.: Fundamentals of Mathematical Statistics, Sultan Chand and Company, 2007.
2. Croxton F.E., Cowden, D.J. and Kelin, S. (1973): Applied General Statistics, Prentice Hall of India.
3. Goon, A.M. Gupta, M.K. and Dasgupta B.: Fundamentals of Statistics, Vol. I, World Press, 2005.

BOOKS SUGGESTED FOR SUPPLEMENTARY READING:-

1. Goon, A.M. Gupta, M.K. and Dasgupta B.: Basic Statistics, World Press, 2005.
2. Gupta, S.C.: Statistical Methods, Himalayan Publishing House, 2003.
3. Nagar, A.L. and Das, R.K., Basic Statistics, Oxford University Press, 2005.

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

- learn to solve Statistical problems using various measure of central tendency.
- collect the data and present it diagrammatically.
- Use Statistics in research for proper characterization, summarization, presentation and interpretation of the result of research.
- apply the statistical methods in various fields such as finance, marketing, accounting and business.

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Khalsa College, Amritsar
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Syllabus for
B.A.
Semester-I
COURSE CODE: STA-111B

COURSE TITLE: PAPER–II: Probability Theory

CREDIT HOURS (PER WEEK):3
TOTAL HOURS: 45 hrs

Medium: English

MAXIMUM MARKS: 56

Time: 3 Hours

L-T-P :3-0-0

INSTRUCTIONS FOR THE PAPER SETTERS:
1. The question paper will consists 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. Section–A will consists of eight short answer type questions, each of 2 marks. Students are to attempt any six.
3. Sections–B, C, D & E will consist of two questions each **(each question should be sudivided into atmost two parts)**. Students are to attempt any four questions in total by selecting one question from each section. Each question carries 11 marks.
4. Teaching time for this paper would be four periods per week.

COURSE OBJECTIVES:
- Students will acquaint themselves with the foundation of probabilistic analysis.
- It will enable the students to quantify the uncertainty and assess the accuracy of our inference about the population.
- Students will have good understanding of exploratory data analysis

COURSE CONTENTS:

Unit-I
Random experiments, sample space, events, mutually exclusive and exhaustive events, algebra of events, various definitions of the probability, axiomatic probability function and its properties.

Unit-II
Finite sample spaces; equally likely outcomes, additive law of probability, conditional probability, multiplicative law of probability, independent events. Baye's Theorem and its applications.

Unit-III
Random variable, examples of random variables, Discrete and continuous random variables, probability mass function and density function, cumulative distribution function, Properties of distribution function of discrete and continuous random variables. Real valued functions of one dimensional random variables and the procedures of finding the Probability Distributionsfunctions of such functions illustrated by examples.

Unit-IV
Expected value of a random variable and of functions of one dimensional random variable. Properties of expected values. variance of random variable and its properties. Moment generating function and its

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properties.

BOOKS PRESCRIBED:-
1. Meyer, P.L. Introductory Probability and Statistical Applications, Addison—Wesley, (1970).
2. Ross, S.A. First Course in Probability, Sixth Edition, Pearson Education, 2007.

Books Suggested for Supplementary Reading:-
1. Biswal, P.C., Probability and Statistics, Prentice Hall, India, 2007.
2. Miller, I, and Miller, M. Mathematical Statistics with Applications, Seventh Edition, Pearson Education, 2007
3. Hogg. R.V., Mcken, J.W. and Craig. A.T., Introduction to Mathematical Statistics, Pearson Education, 2007.

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

- Use statistics in engineering and science like disease modeling, climate prediction networks etc.

- to quantify the uncertainty and assess the accuracy of our inference about the population.

- have good understanding of exploratory data analysis.

- learn the concept of random variable, expected value and moment generating function of random variable.

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Khalsa College, Amritsar
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Syllabus for
PROGRAMME: B.A.
Semester-I
COURSE CODE: STA-111P

COURSE TITLE: Practical based on PAPER: Statistical Methods–I

CREDIT HOURS (PER WEEK): 2
TOTAL HOURS:30 hrs.
MAXIMUM MARKS: 38

Time: 2 Hours   **L-T-P :0-0-2**
MEDIUM: English

INSTRUCTIONS FOR PAPER SETTER AND STUDENTS:

Students are required to prepare a practical note book with at least 30 exercises based upon the above list. At the end of semester, there is a practical examination jointly conducted by two examiners (one is internal and another one is external). This practical examination will cover a written test followed by a viva-voce to test the practical knowledge of students about the contents. The candidates are allowed to use Non–Programmable scientific calculators. The distribution of marks is as under:-

1. Practical Note book: 10 marks
2. Viva – voce: 10 marks
3. Exercises: 18 marks

COURSE OBJECTIVES:
- Students will be able to solve Statistical problems using various measure of central tendency.
- It enables the students to collect the data and present it diagrammatically.
- Students will solve problems related to measure of dispersion.

COURSE CONTENT:
Teaching time for practical paper would be two period per week.

List of practical exercises:
1. Exercises on presentation of Data
2. Exercises on measurers of central tendency
3. Exercises on measures of dispersion
4. Exercises on calculation of moments
5. Exercises on measures of Skewness
6. Exercises on measures of Kurtosis

COURSE OUTCOMES: On completing the course, the students will be able to:
- learn to solve Statistical problems using various measure of central tendency.
- collect the data and present it diagrammatically.
- Use Statistics in research for proper characterization, summarization, presentation and interpretation of the result of research.
- apply the statistical methods in various fields such as finance, marketing, accounting and business.

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Khalsa College, Amritsar
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Syllabus for
PROGRAMME: B.A.
Semester-II
COURSE CODE: STA-121A
COURSE TITLE: Statistical Methods – II

CREDIT HOURS (PER WEEK):4
TOTAL HOURS: 45 hrs
MAXIMUM MARKS: 56

Time: 3 Hours   **L-T-P :3-0-0**

Medium: English

INSTRUCTIONS FOR THE PAPER SETTERS:

1.The question paper will consists 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.Section–A will consists of eight short answer type questions, each of 2 marks. Students are to attempt any six.

3.Sections–B, C, D & E will consist of two questions each(**each question should be sudivided into atmost two parts**). Students are to attempt any four questions in total by selecting one question from each section. Each question carries 11 marks.

4.Teaching time for this paper would be four periods per week.

5**. Simple calculator is allowed.**

COURSE OBJECTIVES:
- Students will understand to find the best fit for a set of data points with the help of method of least square.
- It enables the students to use correlation and regression to predict the behavior of dependent variable.
- Students will use Method of association and contingency table to find the independence of the attributes.

COURSE CONTENT:

UNIT-I

Bivariate data, scatter diagram, covariance, Karl–Pearson's correlation coefficient and its properties, calculation of correlation coefficient from grouped data, bounds of the correlation coefficient, interpretation of the value of the correlation coefficient.

UNIT-II

Spearman's rank correlation coefficient, The principle of least squares, fitting of straight line, polynomials, exponential, logarithmic curve.

UNIT-III

Regression lines, relation between correlation coefficient and regression coefficients.

UNIT-IV

Independence and association of attributes, measures of association,contingency table.

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BOOKS PRESCRIBED:-

1. Goon, A.M. Gupta, M.K. and Dasgupta B., Fundamentals of Statistics, Vol. I, World Press, 2005.
2. Gupta, S.C. and Kapoor, V.K., Fundamentals of Mathematical Statistics, Sultan Chand and Company, 2007.

Books Suggested for Supplementary Reading:-

1. Goon, A.M. Gupta, M.K. and Dasgupta B., Basic Statistics, World Press, 2005.
2. Gupta, S.C., Statistical Methods, Himalayan Publishing House, 2003.
3. Nagar, A.L. and Das, R.K., Basic Statistics, Oxford University Press, 2005.

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

- learn to establish linear association between two variables by using Correlation.
- find the best fit for a set of data points with the help of method of least square.
- use regression to predict the behavior of dependent variable.
- Use Method of association and contingency table to find the independence of the attributes.
- use statistical methods in the future prediction for various observations in different fields like Business Analysis, Artificial Intelligence, Financial Analysis, Fraud Detection, Share Market and Pharmaceutical Sector and other industries.

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Syllabus for
PROGRAMME: B.A.
Semester-II
COURSE CODE: STA-121B

COURSE TITLE: Probability Distributions

CREDIT HOURS (PER WEEK):3
TOTAL HOURS: 45 hrs
Medium: English   **MAXIMUM MARKS: 56**
L-T-P :3-0-0

Time: 3 Hours

INSTRUCTIONS FOR THE PAPER SETTERS:

1.The question paper will consists 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.Section–A will consists of eight short answer type questions, each of 2 marks. Students are to attempt any six.

3.Sections–B, C, D & E will consist of two questions each(**each question should be sudivided into atmost two parts**). Students are to attempt any four questions in total by selecting one question from each section. Each question carries 11 marks.

4.Teaching time for this paper would be four periods per week.
.

5**. Simple calculator is allowed.**

COURSE OBJECTIVES:

- Students will apply the Probability Distributionsin real life situations such as Business Analysis, Artificial Intelligence, Financial Analysis, Fraud Detection etc.

- Students will realize difference between discrete and continuous distributions.

- Students will know about distributions to study the behavior of two random variables

COURSE CONTENT:

Unit–I

Discrete Distributions: Uniform distribution, Bernoulli distribution, Binomial distribution, Poisson distribution, Poisson distribution as limiting form of Binomial distribution, Fittings of Binomial and Poisson distributions,

Unit–II

Geometric distribution, Pascal distribution and Hyper geometric distribution. Properties, expected value, variance and moment generating functions of these distributions.

Unit–III

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Continuous Distributions: Normal distribution, Fitting of normal distribution, Exponential distribution, Uniform distribution.

Unit–IV

Gamma distribution, Beta distribution. The properties of these distribution including their expected values, variances and moment generating functions

BOOKS PRESCRIBED:-

1. Meyer, P.L. Introductory Probability and Statistical Applications, Addison—Wesley, (1970).
2. Hogg. R.V., Mcken, J.W. and Craig. A.T., Introduction to Mathematical Statistics, Pearson Education, 2007.

Books Suggested for Supplementary Reading:-

1. Biswal, P.C., Probability and Statistics, Prentice Hall, India, 2007.
2. Ross, S.A. First Course in Probability, Sixth Edition, Pearson Education, 2007.
3. Miller, I, and Miller, M. Mathematical Statistics with Applications, Seventh Edition, Pearson Education, 2007.

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

- to differentiate discrete and continuous distributions.

- know about distributions to study the behavior of two random variables.

- study the discrete distributions such as Bernoulii, Binomial, Poisson etc.

- Learn about Continuous distributions such as Exponential, Normal, uniform etc. will be studied in this course.

Chairperson, BoS in Mathematics

Khalsa College, Amritsar

(An Autonomous College)

Syllabus for
PROGRAMME: B.A.
Semester-II
COURSE CODE: STA-121P

COURSE TITLE: Practical based on PAPER Statistical methods–II and Probability distributions

CREDIT HOURS (PER WEEK):2
Medium: English   **TOTAL HOURS: 30 hrs**
Time: 2 Hours   **MAXIMUM MARKS: 38**
                                             L-T-P :0-0-2

INSTRUCTIONS FOR PAPER SETTER:

Students are required to prepare a practical note book with at least 30 exercises based upon the above list. At the end of semester, there is a practical examination jointly conducted by two examiners (one is internal and other one is external). External examiner is appointed by the principal of the college. This practical examination will cover a written test followed by a viva-voce to test the practical knowledge of students about the contents. The candidates are allowed to use Non–Programmable calculators.

1. Practical Note book: 10 marks
2. Viva – voce: 10 marks
3. Exercises: 18 marks
4. Teaching time for practical paper would be two period per week per paper.

COURSE OBJECTIVES:

- Students wil understand to find the best fit for a set of data points with the help of method of least square.
- It enables the students to use correlation and regression to predict the behavior of dependent variable.

- Students will realize difference between discrete and continuous distributions.

COURSECONTENT:

List of practical exercises

1. Exercises on calculation of Karl Pearsons correlation coefficient
2. Exercises on calculation of Spearman's rank correlation coefficient
3. Exercises on fittings of regression lines, polynomials, exponential and logarithmic curves.
4. Exercises on fittings of Binomial, Poisson and Normal Distributions
5. Exercises on calculation of probabilities for Binomial, Poisson and Normal Distributions

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

- find the best fit for a set of data points with the help of method of least square.
- use regression to predict the behavior of dependent variable

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- to differentiate discrete and continuous distributions.

- know about distributions to study the behavior of two random variables.

- study the discrete distributions such as Bernoulii, Binomial, Poisson etc.

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