

**PUNJABI UNIVERSITY, PATIALA**

**OUTLINES OF TESTS,  
SYLLABI AND COURSES OF READING**

**FOR**

**B.Sc. (Computer Science, Statistics, Mathematics) Part -I**

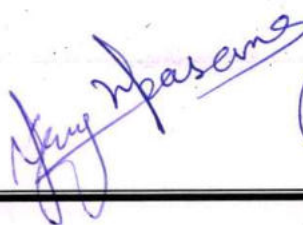



**2022-2023**

Programme Code - STAB3PUP

SYLLABI AND COURSES OF READING



**PUNJABI UNIVERSITY, PATIALA**  
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**SYLLABUS**

**B.Sc. (Computer Science, Statistics, Mathematics) Part – I**

Outlines of Text Syllabi and Courses of Reading.

Note:-Every theory paper will be of three hours duration.

**For Examination of Session 2022-23**

**1st Semester**

Code	Core/ Elective	Title of paper /subject	Hrs./ Week	Max. Marks		Total	Total Credits
				Cont. Asmt.	Uni. Exam.		
STAB1101T	Core	Algebra	4	30	45	75	4
STAB1102T	Core	Trigonometry and Differential Calculus	4	30	45	75	4
STAB1103T	Core	Computer Oriented Statistical Methods-I	3	20	30	50	3
STAB1104T	Core	Probability Theory-I <small>Note:-Every theory paper will be of three hours duration.</small>	3	20	30	50	3
STAB1105P	Core	Statistical Practicals-I	4	-	50	50	2
STAB1106T	Elective	Introduction to Information Technology	3	20	30	50	3
STAB1107T	Elective	Object Oriented Programming Using C++	3	20	30	50	3
STAB1108P	Elective	Computer Practicals- I	4	-	50	50	2
			Total	140	310	450	24

**Note: 1.** The minimum pass marks in each paper is 35% in Continuous Assessment and University Examination separately subject to a minimum of 40% in aggregate.

**2.** In addition to above mentioned subjects, there will be a course of Qualifying Punjabi Compulsory/Elementary Punjabi as a qualifying subject.

Programme Co-ordinator






**BREAK-UP OF MARKS FOR CONTINUOUS ASSESSMENT  
OF THEORY PAPERS**

- |    |  |  |
|----|--|--|
| 1. | Two house/midterm tests will be held and their average will be considered for assessment | 50% Marks                                  |
| 2. | Seminars/Assignments/Quizes/<br>Class participation                                      | 25% Marks                                  |
| 3. | Attendance   | 25% Marks                                  |
|    | Marks will be given according to below criteria:   |  |
|    | 75% attendance & above<br>but less than 80%  | 60% Marks of allotted marks to attendance  |
|    | 80% attendance & above<br>but less than 85%  | 80% Marks of allotted marks to attendance  |
|    | 85% attendance & above   | 100% Marks of allotted marks to attendance |
|    | Seminars/Assignments/Quizes  | 25% Marks                                  |

*[Handwritten signature]*  
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75% attendance & above

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**STAB1101T : ALGEBRA**

No. of Lectures : 55 to be delivered	Max. Marks :	Uni. Examination - 45	} 75
		Int. Assessment - 30	
Time Allowed : 3 Hours	Min. Pass Marks	Uni. Examination - -35%	% Aggregate
		Int. Assessment - -35%	

**INSTRUCTIONS FOR THE PAPER SETTER**

The question paper will consist of three sections A, B and C. Each of sections A and B will have four questions from the respective sections of the syllabus and section C will consist of one compulsory question having seven parts of short-answer type covering the entire syllabus uniformly. All questions of sections A and B will carry 6 marks each where as section C will carry 21 marks

**INSTRUCTIONS FOR THE CANDIDATES**

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C. All questions of sections A and B will carry 6 marks each where as section C will carry 21 marks.

Use of scientific non-programmable calculator is allowed

**SECTION-A**

Relations between the roots and coefficients of general polynomial equation in one variable .Transformation of equations. Descarte's rule of signs: Solution of cubic equations (Cardon method). Biquadratic equations. Mappings, Equivalence relations and partitions .Congruence modulo n. Symmetric, Skew symmetric, Hermitian and Skew Hermitian matrices . Elementary operations on matrices. Inverse of a matrix .

**SECTION-B**

Linear independence of row and column vectors. Row rank ,column rank and rank of a matrix . Equivalence of column and row ranks. Eigen values, eigen vectors and the characteristic equation of a matrix. Cayley Hamilton theorem and its use in finding inverse 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 .

**TEXT BOOKS**

1. P.B. Bhattacharya, S.K. Jain and S.R. Nagpaul, First Course in Linear Algebra, Wiley Eastern, New Delhi ,1983, 2<sup>nd</sup> edition.
2. S.K. Jain, A. Gunawardena and . P.B. Bhatacharya, Basic Linear Algebra with MATLAB, Key College Publishing (Sprinder-Verlag), 2001.

**RECOMMENDED READINGS**

1. K.B. Datta, Matrix and Linear Algebra, Prentice Hall of India Pvt.Ltd., New Delhi, 2004.

*(Handwritten signatures in blue ink)*

Signature 1: Jay Narayan

Signature 2: [Illegible]

Signature 3: [Illegible]

Signature 4: [Illegible]

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**STAB1102T : TRIGONOMETRY AND DIFFERENTIAL CALCULUS**

No. of Lectures : 55 to be delivered	Max. Marks :	Uni. Examination	- 45	} 75
		Int. Assessment	- 30	
Time Allowed : 3 Hours	Min. Pass Marks	Uni. Examination	-35%	} 40% Aggregate
		Int. Assessment	-35%	

**INSTRUCTIONS FOR THE PAPER SETTER**

The question paper will consist of three sections A, B and C. Each of sections A and B will have four questions from the respective sections of the syllabus and section C will consist of one compulsory question having seven parts of short-answer type covering the entire syllabus uniformly. All questions of sections A and B will carry 6 marks each where as section C will carry 21 marks

**INSTRUCTIONS FOR THE CANDIDATES**

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C. All questions of sections A and B will carry 6 marks each where as section C will carry 21 marks.

Use of scientific non-programmable calculator is allowed

**SECTION-A**

**Trigonometry:** De Moivre's theorem and its applications . Direct and inverse circular and hyperbolic functions. Logarithm of a complex quantity. Expansion of trigonometrical functions. Gregory's series. Summation of series.

**SECTION-B**

**Differential Calculus:**  $\epsilon$ - $\delta$  definition of the limit of a function . Basic properties of limits . Continuous functions and classification of discontinuities . Differentiability . Successive differentiation . Leibnitz theorem . Asymptotes . Curvature. Tests for concavity and convexity. Points of inflexion . Multiple points. Tracing of curves ( Cartesian and parametric coordinates only ).

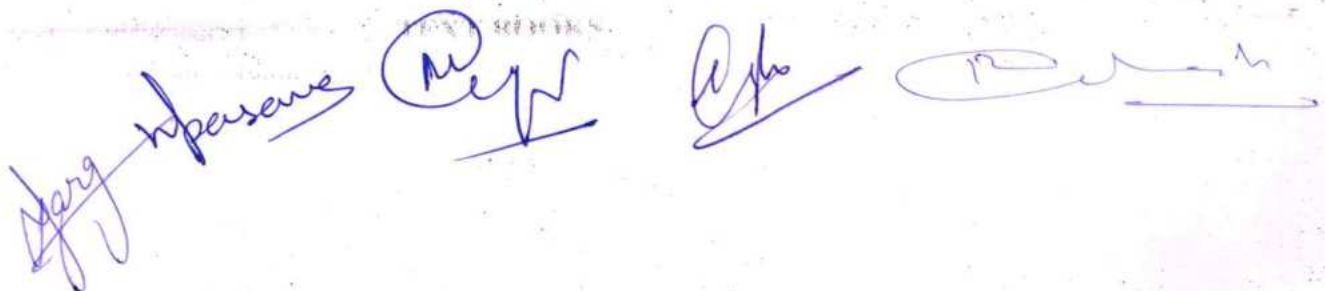
**TEXT BOOKS**

1. S. L. Loney plane Trigonometry Part II, Macmillan and Company, London.
2. R.S. Verma and K.S. Shukla, Text Book on Trigonometry, Pothishala Pvt. Ltd., Allahabad.
3. P.K. Jain and S. K. Kaushik, An introduction to Real Analysis, S. Chand & Co. New Delhi, 2000.
4. Gorakh Prasad Differential Calculus, Pothishala Private Ltd. Allahabad.

**RECOMMENDED READINGS**

1. Gabriel Klambauer, Mathematical Analysis , Marcel Dekkar, Inc. New York, 1975.
2. Murray R. Spiegel, Theory and problems of Advanced Calculus, Schaum's outline series, Schaum Publishing Co. New York, 1963.

RECOMMENDED READINGS



### STAB1103T : COMPUTER ORIENTED STATISTICAL METHODS - I

No. of Lectures : 40 to be delivered	Max. Marks :	Uni. Examination	- 30	} 50
		Int. Assessment	- 20	
Time Allowed : 3 Hours	Min. Pass Marks :	Uni. Examination	-35%	} 40% Aggregate
		Int. Assessment	-35%	

#### INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of three sections A, B and C. Each of sections A and B will have four questions from the respective sections of the syllabus and section C will consist of one compulsory question having seven parts of short-answer type covering the entire syllabus uniformly. All questions of sections A and B will carry 4 marks each where as section C will carry 14 marks

#### INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C. All questions of sections A and B will carry 4 marks each where as section C will carry 14 marks.

Use of scientific non-programmable calculator is allowed

#### SECTION- A

Types of data; Quantitative & Qualitative, Discrete & Continuous, Collection of Primary Data; through designing Questionnaire & Schedule. Secondary Data; Major Sources including some Government Publications. Concept of Population & Sample, Scales of Measurements. Construction of tables with one or more factors of classification, Frequency distributions; Cumulative frequency distributions, Diagrammatic and graphical representation of grouped data; Histogram, Frequency Polygon and Ogives, Stem and leaf chart, Box plot.

#### SECTION-B

Analysis of Quantitative Data: Concept of Central Tendency; its measures. Concept of Dispersion; Absolute and Relative measures of Dispersion. Statistical Moments; Raw, Central and factorial, Inter-relations of moments, Sheppard's Correction for Moments (without derivation). Concepts of Skewness & Kurtosis and their Measures including those based on Quartiles and Moments.

#### TEXT BOOKS

- |    |                    |   |
|----|--------------------|---|
| 1. | Gun, A.M., Gupta   | Fundamentals of Statistics. Vol. 1. 2016, World Press. Calcutta.        |
|    | M.K., Dasgupta, B. |   |
| 2. | Medhi, J.          | Statistical Methods: An Introductory Text, 2005, New Age International. |

#### RECOMMENDED READINGS

1. Ross, S.M. (2010); Introductory Statistics, Academic Press, Elsevier.
2. Wilcox, R.R. (2009); Basic Statistics, Oxford University Press.
3. Croxton F.E, Cowden D. J and Kelin S (1973); Applied General statistics, Prentice Hall of India .
4. Murray Spiegel, Larry Stephens (2007), Schaum's Outline of Statistics, McGraw-Hill.

**STAB1104T : PROBABILITY THEORY – I**

No. of Lectures : 40 to be delivered	Max. Marks :	Uni. Examination	- 30	} 50
		Int. Assessment	- 20	
Time Allowed : 3 Hours	Min. Pass : Marks	Uni. Examination	-35%	} 40% Aggregate
		Int. Assessment	-35%	

**INSTRUCTIONS FOR THE PAPER SETTER**

The question paper will consist of three sections A, B and C. Each of sections A and B will have four questions from the respective sections of the syllabus and section C will consist of one compulsory question having seven parts of short-answer type covering the entire syllabus uniformly. All questions of sections A and B will carry 4 marks each where as section C will carry 14 marks

**INSTRUCTIONS FOR THE CANDIDATES**

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C. All questions of sections A and B will carry 4 marks each where as section C will carry 14 marks.

Use of scientific non-programmable calculator is allowed

**SECTION- A**

Important Concepts in Probability :Random Experiment, Trial, Sample Point and Sample Space, Definition of an Event, Mutually Exclusive, Exhaustive, Independent and Equally Likely Events. Definition of the Probability-Classical and Relative Frequency approach to Probability, their Demerits and Axiomatic Approach to Probability. Properties of Probability Based on Axiomatic Approach, Conditional Probability, Bayes Theorem and Its Applications.

**SECTION- B**

Random Variable : Definition of Discrete Random Variables, Probability Mass Function ,Continuous Random Variable, Probability Density Function Illustrations of Random Variables and Its Properties, Expectation of a Random Variable and its properties-Moments, Measures of Location and Dispersion, Moment Generating Function and Probability Generating Function. Two Dimensional Random Variables Joint, Marginal and Conditional Distributions (Concepts & Simple Applications) .

**TEXT BOOKS**

1. P.L. Meyer ( 1970 ) : Introductory Probability and Statistical Applications Addison-Wesley,2<sup>nd</sup> edition.
2. Gun, A.M., Gupta, M.K., Dasgupta, B.(2016) : Fundamentals of Statistics, Vol. I, World Press ,Calcutta .
3. Mood A.M., Graybill F.A and Boes D.C. (1974) : Introduction to the Theory of Statistics, McGrawh Hill .

**REFERENCE READINGS**

- 4 Bhat B.R, Srivenkatramana T and Rao Madhava K.S. (1997) : Statistics : A Beginner's Text, Vol. II, New Age International (P) Ltd.
- 5 David S (1996) : Elementary Probability, Oxford Press. John E. Freund's Mathematical Statistics 6th Ed. Pub. Pearson Education

Distributions (Concepts & Simple Applications)

**STAB1105P: STATISTICAL PRACTICALS - I**

**Total Practical Sessions: 25**  
**(each of two hours)**  
**Time Allowed : 3 Hours**

**Max. Marks : 50**  
**Min. Pass : 40%**  
**Marks**

**INSTRUCTION FOR THE PAPER SETTER AND THE CANDIDATES**

The setting and evaluation will be done by a board of examiners consisting of Head, External examiner and the teacher(s) involved with the teaching of this paper.

The practical paper will consist of four exercises and the candidates will be required to attempt any three exercises.

The break-up of marks for the University Examination will be as under:

Lab. Record	:	10
Viva-voce	:	10
Exercises	:	30

**Lab Course:**

The exercises will be based on the syllabus of the papers STAB1103T(Computer Oriented Statistical Methods-I) and STAB1104T(Probability Theory-I).

attempt any three exercises



**STAB1106T : INTRODUCTION TO INFORMATION TECHNOLOGY**

No. of Lectures : 40      Max. Marks : **Uni. Examination - 30**  
**Int. Assessment - 20** } 50  
to be delivered

Time Allowed : 3 Hours      Min. Pass : **Uni. Examination -35%**  
**Int. Assessment -35%** } 40% Aggregate  
Marks

**INSTRUCTIONS FOR THE PAPER SETTER**

The question paper will consist of three sections A, B and C. Each of sections A and B will have four questions from the respective sections of the syllabus and section C will consist of one compulsory question having seven parts of short-answer type covering the entire syllabus uniformly. All questions of sections A and B will carry 4 marks each where as section C will carry 14 marks

**INSTRUCTIONS FOR THE CANDIDATES**

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C. All questions of sections A and B will carry 4 marks each where as section C will carry 14 marks.

Use of scientific non-programmable calculator is allowed

**SECTION-A**

**Computer:** Definition, Characteristics of Computers, Basic Applications of Computer, Generations of computers.

**Components of Computer System:** Concepts of Hardware and Software, Central Processing Unit (CPU), input/output Devices, computer Memory: primary and secondary memory, magnetic and optical storage devices.

**Number System:** Bits, Bytes, Moore's Law, Non-Positional and Positional number systems, fractional numbers, Computer code: BCD, EBCDIC, ASCII, UNICODE. Binary, Decimal, Hexadecimal and Octal System, Conversion from one System to another. Binary Arithmetic: Addition, Subtraction and Multiplication.

**Introduction to Computer Language:** Machine Language, Assembly Language, Higher Level Language, Assembler, Compiler, Interpreter.

**SECTION B**

**WWW and Internet:** Introduction, home page, connecting to web, browsing, information search, multimedia. Computer Network and communication: Network types, network topologies, network communication devices, physical communication media. Introduction of E-Commerce: Meaning, its advantages and Limitations, Type of E- Commerce Applications.

**Word Processing-MS Word :** Word Processing Basic: An Introduction to Word Processing and MS-Word, Working with documents, using tables, pictures, and charts, using mail merge and sending a letter to a group of people.

**MS Excel:** Spreadsheet basics, Creating, editing, saving and printing spreadsheets, Working with functions & formulas , Modifying worksheets with color & autoformats, Graphically representing data using Charts & Graphs , Analyzing data using Data Menu, Subtotal, Filtering Data, Formatting worksheets, Securing & Protecting spreadsheets.

**TEXT BOOK :**

1. Curtin D.P., Foley K., Sen K., Morin C "Information Technology" : The breaking wave, TMH.
2. V. Rajaraman, "Fundamentals of computer", PHI, N. Delhi,1996.
3. Chetan Srivastva," Fundamentals of information Technology, Kalayani Publishers, 2003.
4. Anshuman Sharma: "Fundamental of Information Technology", Lakhanpal Publishers

**REFERENCE READINGS:**

1. Williams B. K., Sawyer S.C., Hutchinson S. E., Using Information Technology, 3rd Edition, TMH.

Word: working with documents, using tables, pictures, and charts

**STAB1107T : OBJECT ORIENTED PROGRAMMING USING C++**

No. of Lectures : 40      Max. Marks : 

Uni. Examination	- 30
Int. Assessment	- 20

 } 50  
to be delivered

Time Allowed : 3 Hours      Min. Pass : 

Uni. Examination	-35%
Int. Assessment	-35%

 } 40% Aggregate  
Marks

**INSTRUCTIONS FOR THE PAPER SETTER**

The question paper will consist of three sections A, B and C. Each of sections A and B will have four questions from the respective sections of the syllabus and section C will consist of one compulsory question having seven parts of short-answer type covering the entire syllabus uniformly. All questions of sections A and B will carry 4 marks each where as section C will carry 14 marks

**INSTRUCTIONS FOR THE CANDIDATES**

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C. All questions of sections A and B will carry 4 marks each where as section C will carry 14 marks.

Use of scientific non-programmable calculator is allowed

**SECTION A**

Evolution of OOP: Procedure Oriented Programming, OOP Paradigm, Advantages and disadvantages of OOP over its predecessor paradigms.

Characteristics of Object Oriented Programming: Abstraction, Encapsulation, Data hiding, Inheritance, Polymorphism, Code Extensibility and Reusability, User defined Data Types.

Introduction to C++: Identifier, Keywords, Constants, Operators: Arithmetic, relational, logical, conditional and assignment. Sizeof operator, Operator precedence and associativity.

Type conversion, Variable declaration, expressions, statements, manipulators  
Input and output statements, stream I/O, Conditional and Iterative statements, breaking control statements.

Storage Classes: Automatic, Static, Extern, Register. Arrays, Arrays as Character Strings, Structures, Unions, Bit fields, Enumerations and User defined types:

Pointers: Pointer Operations, Pointer Arithmetic, Pointers and Arrays, Pointer to functions. Functions: Prototyping, Definition and Call, Scope Rules. Parameter Passing: by value, by address and by reference, Functions returning references, Const functions, recursion, function overloading, Default Arguments, Const arguments.

**SECTION B**

Inheritance: Multiple, Multilevel, Hierarchical .

Classes and Objects: Class Declaration and Class Definition, Defining member functions, making functions inline, Nesting of member functions, Members access control. this pointer. Union as space saving classes.

Objects: Object as function arguments, array of objects, functions returning objects, Const member functions. Static data members and Static member functions.

Friend functions and Friend classes.

Constructors: properties, types of constructors (Default, parameterized and copy), Dynamic constructors, multiple constructors in classes. Destructors: Properties, Virtual destructors. Destroying objects. Rules for constructors and destructors.

Array of objects. Dynamic memory allocation using new and delete operators, Nested and container classes. Scopes: Local, Global, Namespace and Class

Inheritance: Defining derived classes, inheriting private members, single inheritance, types of derivation, function redefining, constructors in derived class.

**TEXT BOOKS**

- 1. Herbert Schildt, "The Complete Reference C++", Tata McGraw-Hill, 2001.
- 2. Deitel and Deitel, "C++ How to Program", Pearson Education, 2001

**REFERENCE READINGS**

- 1. Robert Lafore, "Object Oriented Programming in C++", Galgotia Publications, 1994.
- 2. Bjarne Strastrup, "The C++ Programming Language", Addison- Wesley Publication Co., 2001.
- 3. E. Balagurusamy, " Object Oriented Programming with C++", Tata McGraw-Hill, 2001

*[Handwritten signatures and initials in blue ink]*

**STAB1108P : COMPUTER PRACTICALS -I**

**Total Practical Sessions: 25**  
**(each of two hours)**  
**Time Allowed : 3 Hours**

**Max. Marks : Uni. Examination: 50**

**Min. Pass : 40%**  
**Marks**

**INSTRUCTION FOR THE PAPER SETTER AND THE CANDIDATES**

The setting and evaluation will be done by a board of examiners consisting of Head, External examiner and the teacher(s) involved with the teaching of this paper.

The practical paper will consist of four exercises and the candidates will be required to attempt any three exercises.

The break-up of marks for the University Examination will be as under:

Lab. Record	:	10
Viva-voce	:	10
Development of programmes	:	30
& their execution		

**Lab Course:**  
Time Allowed : 3 Hours

The exercises will be based on the syllabus of the papers STAB1103T (Computer Oriented Statistical Methods-I), STAB1106T(Only MS Word and MS Excel) and STAB1107T (OBJECT ORIENTED PROGRAMMING USING C++).

attempt any three exercises.

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**Syllabus**  
**2nd Semester**  
**For Examination of Session 2022-23**


Code	Core/ Elective	Title of paper /subject	Hrs./ Week	Max. Marks		Total	Total Credits
				Cont. Asmt.	Uni. Exam.		
STAB1201T	Core	Integral Calculus & Differential Equations	4	30	45	75	4
STAB1202T	Core	Geometry	4	30	45	75	4
STAB1203T	Core	Computer Oriented Statistical Methods-II	3	20	30	50	3
STAB1204T	Core	Probability Theory-II	3	20	30	50	3
STAB1205P	Core	Statistical Practicals-II	4	-	50	50	2
STAB1206T	Elective	Data Structures	3	20	30	50	3
STAB1207T	Elective	Management Information System	3	20	30	50	3
STAB1208P	Elective	Computer Practicals- II	4	-	50	50	2
			Total	140	310	450	24

**Note:**

1. In addition to above mentioned subjects qualifying course of " Drug Abuse Problem, Management and Prevention " in this semester according to Letter No. 1383/SM-6 dated 12/10/2016 received from A.R.(Meetings)

2. The minimum pass marks in each paper is 35% in Continuous Assessment and University Examination separately subject to a minimum of 40% in aggregate.

3. In addition to above mentioned subjects, there will be a course of Qualifying Punjabi Compulsory/Elementary Punjabi as a qualifying subject.

*Jay pasane*  


*By*  


In addition to above mentioned subjects qualifying course

**BREAK-UP OF MARKS FOR CONTINUOUS ASSESSMENT OF  
THEORY PAPERS**

- |    |  |   |
|----|--|---|
| 1. | Two house/midterm tests will be held and their average will be considered for assessment | 50% Marks                                     |
| 2. | Seminars/Assignments/Quizes/<br>Class participation                                      | 25% Marks                                     |
| 3. | Attendance   | 25% Marks                                     |
|    | Marks will be given according to below criteria:   |   |
|    | 75% attendance & above<br>but less than 80%  | 60% Marks of allotted<br>marks to attendance  |
|    | 80% attendance & above<br>but less than 85%  | 80% Marks of allotted<br>marks to attendance  |
|    | 85% attendance & above   | 100% Marks of allotted<br>marks to attendance |

Attendance

marks to attend

# STAB1201T: INTEGRAL CALCULUS AND DIFFERENTIAL EQUATIONS

No. of Lectures : 55 to be delivered	Max. Marks :	Uni. Examination	- 45	} 75
		Int. Assessment	- 30	
Time Allowed : 3 Hours	Min. Pass Marks :	Uni. Examination	-35%	} 40% Aggregate
		Int. Assessment	-35%	

## INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of three sections A, B and C. Each of sections A and B will have four questions from the respective sections of the syllabus and section C will consist of one compulsory question having seven parts of short-answer type covering the entire syllabus uniformly. All questions of sections A and B will carry 6 marks each where as section C will carry 21 marks

## INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C. All questions of sections A and B will carry 6 marks each where as section C will carry 21 marks.

Use of scientific non-programmable calculator is allowed

### SECTION-A

Integration of irrational algebraic and transcendental functions . Reduction formulae. Definite integrals . Quadrature and rectification . Volumes and surfaces of solids of revolution . Degree and order of a differential equation . Equation of first order and first degree. Equations in which the variables are separable . Homogeneous equations . Linear equations and equations reducible to the linear form . Exact differential equations .

### SECTION-B

First order higher degree equations solvable for x, y, p. Clairaut's form and singular solutions . Geometrical meaning of a differential equation .Orthogonal trajectories .Linear differential equation with constant coefficients .Homogeneous linear ordinary differential equations. Linear differential equations of second order .Transformation of the equation by changing the dependent variable/ the independent variable. Method of variation of parameters .

### TEXT BOOKS

1. Gorakh Prasad, Integral Calculus, Pothishala Private Ltd., Allahabad.
2. D.A. Murray, Introductory Course in Differential Equations, Orient Longman (India),1967.

### RECOMMENDED READINGS

1. H.T.H. Piaggio, Elementary Treatise on Differential Equations and their Applications. C.B.S. Publisher & Distributors, Delhi , 1985.
2. Erwin Kreyszing, Advanced Engineering Mathematics, John Wiley and Sons, 1999.

**STAB1202T- GEOMETRY**

No. of Lectures : 55 to be delivered	Max. Marks :	Uni. Examination	- 45	} 75
		Int. Assessment	- 30	
Time Allowed : 3 Hours	Min. Pass Marks :	Uni. Examination	-35%	} 40% Aggregate
		Int. Assessment	-35%	

**INSTRUCTIONS FOR THE PAPER SETTER**

The question paper will consist of three sections A, B and C. Each of sections A and B will have four questions from the respective sections of the syllabus and section C will consist of one compulsory question having seven parts of short-answer type covering the entire syllabus uniformly. All questions of sections A and B will carry 6 marks each where as section C will carry 21 marks.

**INSTRUCTIONS FOR THE CANDIDATES**

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C. All questions of sections A and B will carry 6 marks each where as section C will carry 21 marks.

Use of scientific non-programmable calculator is allowed

**SECTION-A**

Transformation of axes , shifting of origin, rotation of axes, reduction of the second degree equation into standard forms by transformation of co-ordinates. The invariants  $t$  ,  $\Delta$  and  $\theta$  . Identification of curves represented by second degree equation.

Pole and polar, pair of tangents from a point, chord of contact ,equation of the chord in terms of midpoint and diameter of conic .

Conjugate diameters, Conjugate hyperbola .Asymptotes of a hyperbola, rectangular hyperbola . Special properties of parabola, ellipse and hyperbola.

Polar equations of conics and equations of chords, tangents and normals only .

**SECTION-B**

Sphere . Cone . Cylinder . Central conicoids. Paraboloids. Plane sections of conicoids. Generating lines. Confocal conicoids . Reduction of second degree equation to standard forms.

**TEXT BOOKS**

1. S.L. Loney, The Elements of Coordinate Geometry, Macmillan and Company, London.
2. Gorakh Prasad and H.C. Gupta, Text Book on Coordinate Geometry , Pothishala Pvt. Ltd., Allahabad.
3. P.K. Jain and Khalil Ahmad, A Text Book of Analytical Geometry of two Dimensions, Wiley Eastern Ltd.,1994.
4. N. Saran and R.S. Gupta, Analytical Geometry of Three Dimensions, Pothishala Pvt. Ltd., Allahabad.

**RECOMMENDED READINGS**

1. R.J.T. Bell, Elementary Treatise on Coordinate Geometry of Three Dimensions, Macmillan India Ltd., 1994.

London

**STAB1203T : COMPUTER ORIENTED STATISTICAL METHODS -II**

No. of Lectures : 40	Max. Marks :	Uni. Examination - 30	} 50
to be delivered		Int. Assessment - 20	
Time Allowed : 3 Hours	Min. Pass Marks :	Uni. Examination -35%	} 40% Aggregate
		Int. Assessment -35%	

**INSTRUCTIONS FOR THE PAPER SETTER**

The question paper will consist of three sections A, B and C. Each of sections A and B will have four questions from the respective sections of the syllabus and section C will consist of one compulsory question having seven parts of short-answer type covering the entire syllabus uniformly. All questions of sections A and B will carry 4 marks each where as section C will carry 14 marks

**INSTRUCTIONS FOR THE CANDIDATES**

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C. All questions of sections A and B will carry 4 marks each where as section C will carry 14 marks.

Use of scientific non-programmable calculator is allowed

**SECTION - A**

Bivariate Data :Scatter Diagram, Product Moment Correlation Coefficient and its properties, Coefficient of Determination, Spearman's Rank Correlation Coefficient, Concept of Errors in Regression, Principle of Least Square, Fitting of Linear Regression and related results.

**SECTION-B**

Multivariate Data: Concepts of Multiple Regression, Multiple and Partial Correlation Coefficients derivation only for trivariate and their Applications.

Analysis of Categorical Data: Basic concepts, Contingency of Data ,Independence & Association of Attributes, Various Measures of Association for Two Way Classified Data.

**TEXT BOOKS**

1. Gun, A.M., Gupta M.K., Dasgupta, B. Fundamentals Of Statistics. Vol. 1. 2016, world Press. Calcutta.

**REFERENCE READINGS**

2. Bhat B.R, Srivenkatramana T and Rao Madhava K.S. (1997): Statistics : A Beginner's Text, Vol, I , New Age International (P) Ltd.
3. Croxton F.E, Cowden D. J and Kelin S (1973) : Applied General statistics, Prentice Hall of India .
4. Spiegel, M.R. (1967): Theory & Problems of Statistics, Schaum's Publishing Series.
5. W.W. Daniel : Bio Statistics : A foundation for Analysis in the Health Sciences 7th Ed. (1999).

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**STAB1204T: PROBABILITY THEORY- II**

No. of Lectures : 40 to be delivered	Max. Marks :	Uni. Examination	- 30	} 50
		Int. Assessment	- 20	
Time Allowed : 3 Hours	Min. Pass : Marks	Uni. Examination	-35%	} 40% Aggregate
		Int. Assessment	-35%	

**INSTRUCTIONS FOR THE PAPER SETTER**

The question paper will consist of three sections A, B and C. Each of sections A and B will have four questions from the respective sections of the syllabus and section C will consist of one compulsory question having seven parts of short-answer type covering the entire syllabus uniformly. All questions of sections A and B will carry 4 marks each where as section C will carry 14 marks

**INSTRUCTIONS FOR THE CANDIDATES**

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C. All questions of sections A and B will carry 4 marks each where as section C will carry 14 marks.

Use of scientific non-programmable calculator is allowed

**SECTION- A**

Standard univariate discrete distributions and properties : Discrete uniform, Binomial, Poisson, Hyper Geometric, Geometric and Negative Binomial distributions. Continuous univariate distributions: Uniform , Normal , Exponential, Gamma, Beta and Chi-square distributions.

**SECTION-B**

The bivariate normal distribution, the marginal and conditional probability distributions associated with the bivariate normal distribution (without derivation). Chebyshev's inequality and its applications, statements and applications of weak law of large numbers and central limit theorems (De-moivre's-Laplace and Lindeberg-Levy versions).

**TEXT BOOKS**

1. P.L. Meyer ( 1970 ) : Introductory Probability and Statistical Applications Addison-Wesley, 2<sup>nd</sup> edition.
2. Gun, A.M., Gupta, M.K., Dasgupta, B.(2016) : Fundamentals of Statistics, Vol. I, World Press ,Calcutta .
3. Mood A.M., Graybill F.A and Boes D.C. (1974) : Introduction to the Theory of Statistics, McGrawh Hill .

**REFERENCE READINGS**

1. Bhat B.R, Srivenkatramana T and Rao Madhava K.S. (1997) : Statistics : A Beginner's Text, Vol. II, New Age International (P) Ltd.
2. David S (1996) : Elementary Probability, Oxford Press.
3. John E. Freund's Mathematical Statistics 6th Ed. Pub. Pearson Education

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**STAB1205P:STATISTICAL PRACTICALS-II**

**Total Practical Sessions: 25**  
**(each of two hours)**  
**Time Allowed : 3 Hours**

**Max. Marks : 50**  
**Min. Pass : 40%**  
**Marks**

**INSTRUCTION FOR THE PAPER SETTER AND THE CANDIDATES**

The setting and evaluation will be done by a board of examiners consisting of Head, External examiner and the teacher(s) involved with the teaching of this paper.

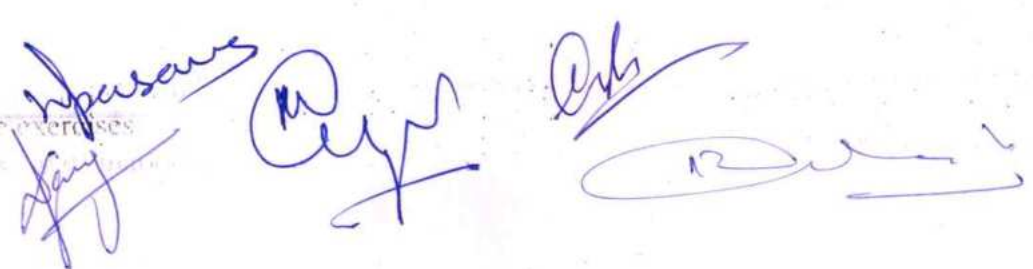
The practical paper will consist of four exercises and the candidates will be required to attempt any three exercises.

The break-up of marks for the University Examination will be as under:

Lab. Record	:	10
Viva-voce	:	10
Exercises	:	30

**Lab Course:**

The exercises will be based on the syllabus of the papers STAB1203T(Computer Oriented Statistical Methods-II) and STAB1204T(Only Fitting of distributions).

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at least any three exercises

**STAB1206T: DATA STRUCTURES**

<b>No. of Lectures : 40</b>	<b>Max. Marks :</b>	<b>Uni. Examination</b> - 30	} 50
<b>to be delivered</b>		<b>Int. Assessment</b> - 20	
<b>Time Allowed : 3 Hours</b>	<b>Min. Pass :</b>	<b>Uni. Examination</b> - 35%	} 40% Aggregate
	<b>Marks</b>	<b>Int. Assessment</b> - 35%	

**INSTRUCTIONS FOR THE PAPER SETTER**

The question paper will consist of three sections A, B and C. Each of sections A and B will have four questions from the respective sections of the syllabus and section C will consist of one compulsory question having seven parts of short-answer type covering the entire syllabus uniformly. All questions of sections A and B will carry 4 marks each where as section C will carry 14 marks

**INSTRUCTIONS FOR THE CANDIDATES**

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C. All questions of sections A and B will carry 4 marks each where as section C will carry 14 marks.

Use of scientific non-programmable calculator is allowed

**SECTION A**

Data structures and data structure operations, ADT Concept, algorithmic complexity and time space trade off.

Introduction to basic data structures such as arrays, linked-lists, stacks and queues, Linked and sequential representation, Basic operations such as insertion, deletion, searching.

Linked list, representation of linked list, doubly linked-list, circular linked list.

Implementation of stacks, postfix to infix conversion and evaluation of expressions using stacks, Queue, Dequeues and their applications.

**SECTION B**

Tree : definitions and basic concepts, linked tree representation, representations in contiguous storage, binary trees, binary search tree : traversal searching, insertion in BST, heap and heap sort algorithm.

Graphs and their application, sequential and linked representation of graph, operations on graph, traversing a graph, Dijkstra's algorithm for shortest distance, DFS and BFS.

Searching and sorting : linear and binary search, hash search, insertion, selection merge, radix, bubble, quick sort. Memory management: Allocation, garbage collection, fragmentation & compaction.

**TEXT BOOKS**

1. Seymour Lipschutz "Theory & Practice of Data Structures", McGraw Hill, 1988.

**REFERENCE READINGS**

1. Thomas Naps and Bhagat Singh, Introduction to Data Structures with Pascal., West Publishing. 1986
2. Tenenbaum, Y. Lanhgsam and A. J. Augenstein, "Data Structures Using C and C++", Prentice Hall of India, 1990.
3. E. Horowitz and S. Sahni, "Data Structures with Pascal", Galgotia, 3<sup>rd</sup> Edition, 1991.
4. Ah. A.V. Hopcraft J.E. and Ullman, J.D. "The Design and Analysis of Computer Alorithms", Addison Wesley.

### STAB1207T: Management Information System

No. of Lectures : 40 to be delivered	Max. Marks :	Uni. Examination	- 30	} 50
		Int. Assessment	- 20	
Time Allowed : 3 Hours	Min. Pass :	Uni. Examination	-35%	} 40% Aggregate
		Int. Assessment	-35%	
Marks				

#### INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of three sections A, B and C. Each of sections A and B will have four questions from the respective sections of the syllabus and section C will consist of one compulsory question having seven parts of short-answer type covering the entire syllabus uniformly. All questions of sections A and B will carry 4 marks each where as section C will carry 14 marks

#### INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C. All questions of sections A and B will carry 4 marks each where as section C will carry 14 marks.

Use of scientific non-programmable calculator is allowed

#### SECTION A

Framework of Management Information Systems: Importance's of MIS, Concepts of Management, information, system, Definition of MIS, information technology and MIS, nature and scope of MIS, MIS characteristics and functions.

Structure and classification of MIS: structure of MIS, MIS classification, Brief introduction of functional information system, financial information system, marketing information system, production/ Manufacturing information system, human resources information system.

Decision making and MIS: decision making, Simon's model of decision making, types of decisions, purpose of decision making, level of programmability, knowledge of outcomes, methods of choosing among alternatives, decision making and MIS.

Information and system concepts: types of information: strategic information, Tactical information, Operational information. Information quality, dimensions of information, System: Kinds of Systems, System related concepts, elements of systems, Human as an information processing system.

#### SECTION B

System development stages: System investigation, system analysis, system design, construction and testing, implementation, maintenance.

System development approaches (a brief introduction) : waterfall model, prototyping, iterative enhancement model, spiral model.

System analysis: introduction, requirement definition, , strategies for requirement definition, structured analysis tools: data flow diagram, data dictionary, decision trees , structured English, decision trees.

System Design: objectives, conceptual design, design methods, detailed system design.

Implementation and evaluation of MIS: implementation process, Hardware and software selection, Evaluation MIS, System maintenance.

Information system Planning: Information system Planning, planning terminology, the Nolan stage model, selecting a methodology, information resources management.

Information system (IS) as an Enabler: introduction, changing concepts of IS , IS as an enabler

#### TEXT BOOKS

1. D.P. Goyal, " Management information systems", Macmillan India Ltd.

#### REFERENCE READINGS

1. Bentley, "System Analysis and Design", TMH
2. Robert G. Murdick & Joel E. Ross & James R. Claggett, "Information Systems for Modern Management" PHI.
- 3.A. Ziya Aktas, "Structured Analysis & Design of Information System", PHI.
- 4.V. Rajaraman, "Analysis & Design of Information Systems", PHI.
- 5.J. Kanter, "Management/Information Systems", PHI.

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### STAB1208P: COMPUTER PRACTICALS - II

**Total Practical Sessions: 25**  
**(each of two hours)**  
**Time Allowed : 3 Hours**

**Max. Marks : 50**

**Min. Pass : 40%**  
**Marks**

#### INSTRUCTION FOR THE PAPER SETTER AND THE CANDIDATES

The setting and evaluation will be done by a board of examiners consisting of Head, External examiner and the teacher(s) involved with the teaching of this paper.

The practical paper will consist of four exercises and the candidates will be required to attempt any three exercises.

The break-up of marks for the University Examination will be as under:

Lab. Record	:	10
Viva-voce	:	10
Development of programmes	:	30

**& their execution**

**Lab Course:**

The exercises will be based on the syllabus of the papers STAB1206T (Data Structures).

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