PUNJABI UNIVERSITY, PATIALA

OUTLINES OF TESTS,

SYLLABI AND COURSES OF READING

FOR

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

2020-2021, 2021-2022 & 2022-2023

PUNJABI UNIVERSITY, PATIALA

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 2020-21, 2021-22 & 2022-23.
1st Semester

Code	Core/ Elective	Title of paper/ subject	Hrs./ Week	Max Maks Conti. Asmt.	Univ. Exam.		Total	Total Credits
CSM 111	Core	Algebra	4	30	45		75	4
CSM 112	Core	Trigonometry and Differential Calculus	4	30	45		75	4
CSM 113	Core	Computer Oriented Statistical Methods-I	3	20	30		50	3
CSM 114	Core	Probability Theory-I	3	20	30		50	3
CSM 115	Core	Statistical Practicals-I	4	-	50		50	2
CSM 116	Elective	Introduction to Information Technology	3	20	30		50	3
CSM 117	Elective	Object Oriented Programming Using C++	3	20	30		50	3
CSM 118	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.

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/ Class participation	25% Marks
3.	Attendance Marks will be given according to below criteria: 75% attendance & above but less than 80%	25% Marks 60% Marks of allotted marks to attendance
	80% attendance & above but less than 85%	80% Marks of allotted marks to attendance
	85% attendance& above	100% Marks of allotted marks to attendance

CSM-111 ALGEBRA

No. of Lectures : 55
to be delivered

Max. Marks: $\left.\begin{array}{l}\text{Uni. Examination} \quad - \quad 45 \\ \text{Int. Assessment} \quad - \quad 30\end{array}\right\}$ 75

Time Allowed   : 3 Hours

Min. Pass   : $\left.\begin{array}{l}\text{Uni. Examination} \quad - \quad 35\% \\ \text{Int. Assessment} \quad - \quad 35\%\end{array}\right\}$ 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 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. lnverse 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, New Age International, **2008.**
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.

CSM-112 : TRIGONOMETRY AND DIFFERENTIAL CALCULUS

No. of Lectures : 55
to be delivered

Max. Marks: $\begin{rcases} \text{Uni. Examination} & - 45 \\ \text{Int. Assessment} & - 30 \end{rcases}$ 75

Time Allowed : 3 Hours

Min. Pass : Marks $\begin{rcases} \text{Uni. Examination} & - 35\% \\ \text{Int. Assessment} & - 35\% \end{rcases}$ 40% Aggregate

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 quantiy. Expansion of trigonometrical functions. Gregory's series. Summation of series.

SECTION-B

Differential Calculus: − 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, G. K. Publications Pvt. Ltd. 2012
2. R.S. Verma and K.S. Shukla, Text Book on Trigonometry, Pothishala Pvt. Ltd., Allahabad, 10th Edition, 1999.
3. P.K. Jain and S. K. Kaushik, Introduction to Real Analysis, S. Chand & Co. New Delhi, 2000.
4. Gorakh Prased Differential Calculus, Pothishala Private Ltd. Allahabad, 19th Edition, 2016.

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, McGraw-Hill. 1974.

CSM-113 : 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 : Uni. Examination − 35% } 40% Aggregate
Marks 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 M.K., Dasgupta, B.	Fundamentals of Statistics. Vol. 1. 2016, World Press. Calcutta.
2.	Medhi, J.	Statistical Methods: An Introductory Text, 2005, New Age International.

RECOMMENDED READINGS

1. Ross, S.M. (2017); 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. (1982). Applied General Statistics, Prentice-Hall of India, 3rd Edition.
4. Spiegel, M.R., Stephens, L.J., (2017). Schaum's Outlines of Statistics. McGraw-Hill Education, 6th Edition.

CSM-114 : PROBABILITY THEORY – I

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

to be delivered

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

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 (2017).** Introductory Probability and Statistical Applications, **Oxford & IBH publishing , 2^(nd) 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. **(2017):** Introduction to the Theory of Statistics, McGrawh Hill**, 3^(rd) Edition**.

REFERENCE READINGS

1. Bhatt, B. R., Srivenkatramana, T., and Rao Madhava, K. **(1999).** Statistics: A Beginners Text, Vol. II. New Age International (P) Ltd.

2. David S. **(2003).** Elementary Probability, **Cambridge University Press, 2^(nd) Edition.**.

CSM-115: STATISTICAL PRACTICALS - I

Total Practical Sessions: 25   Max. Marks :   50
(each of two hours)
Time Allowed : 3 Hours   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 CSM-113(Computer Oriented Statistical Methods-I) and CSM-114(Probability Theory-I).

CSM - 116 : INTRODUCTION TO INFORMATION TECHNOLOGY

No. of Lectures : 40 to be delivered

Max. Marks: Uni. Examination -30 ⎫ Int. Assessment -20 ⎬ 50

Time Allowed : 3 Hours

Min. Pass Marks : Uni. Examination -35% ⎫ Int. Assessment -35% ⎬ 40% Aggregate

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 & auto formats, 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, **McGraw-Hill Education (ISE Editions), International Ed Edition, 1998.**
2.   V. Rajaraman, **N. Adabala** "Fundamentals of computer", PHI Learning Pvt. Ltd., **6th Edition, 2014**.
3.   Chetan Srivastva," Fundamentals of information Technology, Kalayani Publishers, 2003.
4.   Anshuman Sharma: "Fundamental of Information Technology", Lakhanpal Publishers, **2016.**

REFERENCE READINGS:

1.   Williams B. K., Sawyer S.C., Using Information Technology, **McGraw-Hill Education, 11th Edition, 2014.**

CSM - 117: : OBJECT ORIENTED PROGRAMMING USING C++

No. of Lectures   :   40
to be delivered

Max. Marks: Uni. Examination − 30 }
              Int. Assessment   − 20 } 50

Time Allowed   : 3 Hours

Min. Pass
Marks
:   Uni. Examination − 35% }
    Int. Assessment   − 35% } 40% Aggregate

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, 4th Edition, **2017.**
2.   Deitel, P.J., and Deitel, H.M., "C++ How to Program", Pearson Education, **10th Edition, 2017.**

REFERENCE READINGS

1. Robert Lafore, "Object Oriented Programming in C++", **Pearson Education India, 4th Edition, 2008**.
2. Bjarne Strautrup, "The C++ Programming Language", **Pearson Education India, 3rd Edition, 2002.**
3. E. Balagurusamy, " Object Oriented Programming with C++", McGraw Hill Education, **7th Edition, 2017.**

CSM-118 : COMPUTER PRACTICALS -I

Total Practical Sessions: 25   **Max. Marks : Uni. Examination: 50**
(each of two hours)
Time Allowed   : 3 Hours   **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 CSM-113 (Computer Oriented Statistical Methods-I), CSM-116(Only MS Word and MS Excel) and CSM-117 (OBJECT ORIENTED PROGRAMMING USING C++).

2nd Semester
For Examination of Session 2020-21, 2021-22 & 2022-23.

Code	Core/ Elective	Title of paper/ subject	Hrs./ Week	Max Marks		Total	Total Credits
				Cont. Asmt.	Univ. Exam.		
CSM 121	Core	Integral Calculus & Differential Equations	4	30	45	75	4
CSM 122	Core	Geometry	4	30	45	75	4
CSM 123	Core	Computer oriented Statistical Methods-II	3	20	30	50	3
CSM 124	Core	Probability Theory-II	3	20	30	50	3
CSM 125	Core	Statistical Practicals-II	4	-	50	50	2
CSM 126	Elective	Data Structures	3	20	30	50	3
CSM 127	Elective	Management Information System	3	20	30	50	3
CSM 128	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.

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/ Class participation	25% Marks
3.	Attendance Marks will be given according to below criteria: 75% attendance & above but less than 80%	25% Marks
		60% Marks of allotted marks to attendance
	80% attendance & above but less than 85%	80% Marks of allotted marks to attendance
	85% attendance& above	100% Marks of allotted marks to attendance

CSM 121: INTEGRAL CALCULUS AND DIFFERENTIAL EQUATIONS

No. of Lectures : 55
to be delivered

Max. Marks: $\left.\begin{array}{l}\text{Uni. Examination} \quad - \quad 45 \\ \text{Int. Assessment} \quad - \quad 30\end{array}\right\}$ 75

Time Allowed : 3 Hours

Min. Pass Marks : $\left.\begin{array}{l}\text{Uni. Examination} \quad - \quad 35\% \\ \text{Int. Assessment} \quad - \quad 35\%\end{array}\right\}$ 40% Aggregate

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 from . 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., **2015**.
2. D.A. Murray, Introductory Course in Differential Equations, Orient Blackswan Pvt Ltd.,**New Delhi, 2012**.

RECOMMENDED READINGS

1. H.T.H. Piaggio, An Elementary Treatise on Differential Equations and their Applications. **Alpha Edition, 2019**.
2. Erwin Kreyszing, Advanced Engineering Mathematics, Wiley, **10th Edition, 2015**.

CSM 122- 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 , and . 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 concoids. Generating lines. Confocal conicoids . Reduction of second degree equation to standard forms.

TEXT BOOKS

1. S.L. Loney, The Elements of Coordinate Geometry, **Arihant Publications, 16th Edition, 2016.**
2. Gorakh Prasad and H.C. Gupta, Text Book on Coordinate Geometry , Pothishala Pvt. Ltd., **2000.**
3. P.K. Jain and Khalil Ahmad, A Text Book of Analytical Geometry oftwo Dimensions, **New Age Publishers, 1996.**
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, **Forgotten Books, 2018.**

CSM-123 : COMPUTER ORIENTED STATISTICAL METHODS –II

No. of Lectures : 40
to be delivered

Max. Marks: $\begin{aligned}&\text{Uni. Examination} &-\ 30\\&\text{Int. Assessment} &-\ 20\end{aligned}\Big\}\ 50$

Time Allowed : 3 Hours

Min. Pass Marks : $\begin{aligned}&\text{Uni. Examination} &-\ 35\%\\&\text{Int. Assessment} &-\ 35\%\end{aligned}\Big\}\ 40\%\ \text{Aggregate}$

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

1. Bhat B.R., Srivenkatramana T., and Rao Madhava K.S. (1997). Statistics : A Beginner's Text, Vol. I , New Age International (P) Ltd.
2. Croxton F.E., Cowden D. J., and Kelin S. **(1982)** : Applied General statistics, Prentice Hall of India, **3rd Edition.**
3. Spiegel, M. R. **(1992).** Schaum's Outline of Theory and Problems of Statistics (Schaum's Outline S)
4. Daniel W.W. **(2012)** Biostatistics: A Foundation for Analysis in the Health Sciences **10th edition (Wiley Series in Probability and Statistics)**

CSM-124: PROBABILITY THEORY– II

No. of Lectures : 40
to be delivered

Max. Marks: $\left. \begin{array}{l} \text{Uni. Examination} \quad - \quad 30 \\ \text{Int. Assessment} \quad - \quad 20 \end{array} \right\}$ 50

Time Allowed : 3 Hours

Min. Pass Marks : $\left. \begin{array}{l} \text{Uni. Examination} \quad - \quad 35\% \\ \text{Int. Assessment} \quad - \quad 35\% \end{array} \right\}$ **40% Aggregate**

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 **(2017).** Introductory Probability and Statistical Applications**, Oxford & IBH publishing , 2nd 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. **(2017):** Introduction to the Theory of Statistics, McGrawh Hill, **3rd Edition.**

REFERENCE READINGS

1. Bhatt, B. R., Srivenkatramana, T., and Rao Madhava, K. (1999). Statistics: A Beginners Text, Vol. II. New Age International (P) Ltd.
2. David S (2003). Elementary Probability, Cambridge University Press, 2nd Edition.
3. Freund's J. E. (2013) Mathematical Statistics with Applications, Pearson Education India; 8 edition

CSM-125:STATISTICAL PRACTICALS-II

Total Practical Sessions: 25   **Max. Marks : 50**
 (each of two hours)
Time Allowed   : 3 Hours   **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 CSM-123(Computer Oriented Statistical Methods-II) and CSM-124(Only Fitting of distributions).

CSM - 126: DATA STRUCTURES

No. of Lectures : 40
to be delivered

Time Allowed : 3 Hours

Max. Marks: Uni. Examination − 30 ⎫
Int. Assessment − 20 ⎭ 50

Min. Pass Marks : Uni. Examination − 35% ⎫
Int. Assessment − 35% ⎭ 40% Aggregate

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 " Data Structures", McGraw Hill, **2014.**

REFERENCE READINGS

1. Thomas Naps and Bhagat Singh, Introduction to Data Strucutres with Pascal., West Publishing Co. 1986.
2. Tenenbaum, Y. Lanhghsam and A. J. Augenstein, "Data Structures Using C and C++", **Pearson Education India, 2ⁿᵈ Edition, 2015.**
3. E. Horowitz and S. Sahni, "Fundamental of Data Structures with Pascal", **W. H. Freeman and Co.,4ᵗʰ Edition, 1993.**
4. Ah. A.V. Hopcraft J.E. and Ullman, J.D. "The Design and Analysis of Computer Alorithms", Addison Wesley, **1974.**

CSM - 127: 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 : 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

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", **Vikas Publishing House, 4th Edition 2014.**

REFERENCE READINGS

1. Bentley,"System Analysis and Design",McGraw-Hill**/Irwin, 2007**.
2. Robert G. Murdick & Joel E. Ross & James R. Claggett, "Information Systems for Modern Management"Prentice-Hall, **1975.**
3. A. Ziya Aktas, "Structured Analysis & Design of Information System", Prentice-Hall, **1987.**
4. V. Rajaraman, "Analysis & Design of Information Systems", Prentice-Hall, **3rd Edition, 2018.**
5. J. Kanter, "Management/Information Systems", Prentice-Hall, **1984.**

CSM-128: COMPUTER PRACTICALS - II

Total Practical Sessions: 25   **Max. Marks :   50**
 (each of two hours)
Time Allowed : 3 Hours   **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 CSM -126 (Data Structures).