B.Sc (Computer Science, Statistics, Mathematics)-1 (Semester-1)
Session 2025-26

Paper Code: BCSM101
Subject: Information Technology
Theory Marks: 50
Internal Assessment: 20

Credit: 03(Th), 01 (Practical)
Minimum Pass Marks: 35%
Lectures to be delivered: 45-55

Course Objectives

- Aware students about basic of computer and its evolution. Provide knowledge of different units of computer like processing unit, IO unit, and Storage unit.
- Applications of IT.
- Advanced trends in IT.
- Have a clear understanding of fundamentals of computers so as to apply it in real life problems.
- Develop an in-depth knowledge of various motivational theories.
- To give fundamental knowledge Office tools.

Learning Outcome

- On the successful completion of the course, students will be able to;
- Have a clear understanding of documents, sheets and presentation.
- Develop an in-depth knowledge of various office theories.
- Develop skills to get employment in I.T Field.

A) Instructions for paper-setter

The question paper will consist of three sections, Sections A, B & C. Sections A & B will have four questions each from the respective sections of the syllabus. Each question will carry 08 marks, which may be segregated into sub-parts. Section C will be compulsory with 09 short answer type questions of 02 marks each, which will cover the entire syllabus.

B) Instructions for candidates

1. Candidates are required to attempt two questions each from sections A & B of the question paper and the entire section C.

SECTION A

Computer Fundamentals: Block diagram of a computer, characteristics of computers and generations of computers. Categories of Computers - Supercomputer, mainframe computer, network server, Workstation, Desktop computers, notebook computer, Tablet PC, handheld PC, smart phone.
Input Devices: Keyboard, Mouse, Joy tick, Track Ball, Touch Screen, Light Pen, Digitizer, Scanners, Speech Recognition Devices, Optical Recognition devices - OMR, OBR, OCR
Output Devices: Monitors, Impact Printers - Dot matrix, Character and Line printer, Non impact Printers - Deskjet and Laser printers, Plotter.
Memories: Memory Hierarchy, Primary Memory - RAM, ROM, Cache memory. Secondary
Storage Devices: Hard Disk, Compact Disk, DVD, Flash memory.
Software: Types of Software- System Software, Application Software, Firmware. Type of software
Number System: Non-positional and positional number systems, Base conversion, Concept of Bit and Byte, Binary, Decimal, Hexadecimal, and Octal systems, conversion

SECTION B

MS Word: Introduction to Word Processing, Toolbars, Ruler, Menus, Keyboard Shortcut. Previewing documents, printing documents, formatting documents, Checking the grammar and spelling, formatting via find and replace, Mail Merge and sending a letter to a group of people, working with documents using tables, pictures, and charts.

MS PowerPoint: Introduction, Elements of Power Point Package, Starting and exploring Power Point menus (Insert, Format, Tools, Slide Show, Window, help options and all of their features, Options and sub options etc.), Creating, inserting, deleting and formatting slides, Formatting and enhancing text, Slides with graphs, Giving Animation to slides, Transfer of files between Power Point and other word processors and software packages.

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.

Reference Books:

- Peter Nortorn, Introduction to Computers, Seventh Edition
- V. Rajaraman, Fundamentals of Computers, PHI.
- N. Subramanian, Introduction to Computers, Tata McGraw-Hill.
- D.H. Sanders, Computers Today, McGraw-Hill,
- Rob Tindrow, Jim Boyce, Jeffrey R. Shapiro, Windows 10 Bible, Wiley.
- Anshuman Sharma: "Fundamental of Information Technology", Lakhanpal Publisher
- Pradeep K. Sinha: "Computer Fundamental", BPB Publications

BCSM102 Computer Oriented Statistical Methods

Pass Percentage:35%
Internal Assesment:20
External Examination:50

Course Objective: To impart knowledge about gathering information in a measured and systematic manner to ensure accuracy and facilitate data analysis.

Course Learning Outcomes:
On completion of this course, the student will be able
CO-1. To learn various techniques for graphical representation of data.
CO-2. To understand the concept of correlation and regression of data.
CO-3. To study the basic concepts of data collection and its analysis.

Instructions for Paper Setter/Examiner

The question paper will consist of three sections. Section A, B and C. Section A and B will have four questions each from the respective sections of the syllabus out of which the student will be required to attempt two questions from each Section. Each question will carry 8 marks. Section C will be compulsory with 9 short-answer type questions of 02 marks each which will cover the entire Syllabus

Instructions for 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.

SECTION -A

Statistics: Definition, Types of data: qualitative and quantitative, discrete and continuous, Scales of measurement: nominal, ordinal, ratio, interval, Methods of collection of primary and secondary data, Diagrammatic and Graphical representation of data: bar, multiple bar, pie chart, histogram, frequency polygon, frequency curve, ogives, box plot.

Analysis of quantitative data: Measures of central tendency: mean, median, mode, quartiles, deciles, percentiles, G.M., H.M., Measure of dispersion: range, Quartile deviation, mean deviation, Standard deviation, coefficient of variation.

Statistical moments: Raw and Central (no derivation), Skewness & Kurtosis and its measurements.

SECTION- B

Bivariate data: Concept of correlation and its properties, Scatter diagram, Karl's Pearson coefficient of correlation, Spearman's Rank correlation coefficient, Simple linear regression and its properties, principle of least square, fitting of linear regression and related results, angle between two lines of regression, coefficient of determination.

Multivariate data: partial and multiple correlation coefficients, concepts of multiple regression (Applications only)

Analysis of categorical data: Basic concept, contingency of data, Independence &association of attributes.

Books Recommended:

1. J.E. Freund, Mathematical Statistics with Applications, 8th Edition, Pearson Education, 2014.
2. A.M. Goon, M.K. Gupta and B. Dasgupta, Fundamentals of Statistics, Vol. 1, 8th Edition, World Press, Kolkata, 2005.
3. S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, 11th Edition, Sultan Chand and Sons, 2014.
4. A.M. Mood, F.A. Graybill and D.C. Boes, Introduction to the Theory of Statistic

BCSM-103 ALGEBRA AND DIFFERENTIAL CALCULUS

External Marks: 70
Pass percentage:35%
Int. Assessment: 30

Course Objective: *The objective of the course is to help the students to acquire the skills to solve simultaneous linear equations using concept of rank and learn applications of derivatives.*

Course Learning Outcomes:

On completion of this course, the student will be able to

CO-1. Learn to find inflexion points of a curve using the concept of derivatives.

CO-2. Learn the concept of diagonalization of a matrix.

CO-3. Understand how to find Eigen values and corresponding eigenvectors for a square matrix.

CO-4. Learn the concept of limit and continuity of a function of single variable.

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 12 marks each whereas section C will carry 22 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 12 marks each whereas section C will carry 22 marks.

SECTION-A

Hermitian and skew- Hermitian matrices, Elementary operations on matrices, linear independence and dependence of row and column vectors, row rank, column rank and rank of a matrix and their equivalence, Normal form of a matrix, Theorems on consistency of a system of linear equations (both homogeneous and non-homogeneous). Eigen-values, Eigen-vectors and characteristic equation of a matrix, Cayley-Hamilton theorem and its use in finding inverse of a matrix, Diagonalization

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.

RECOMMENDED *TEXT BOOKS*

1. K.B. Datta: Matrix and Linear Algebra, Prentice Hall of India Pvt. Ltd., New Delhi, 2000.
2. S. R. Knight and H.S. Hall: Higher Algebra, H.M. Publications, 1994.
3. *P.K. Jain and S. K. Kaushik, Introduction to Real Analysis, S. Chand & Co. New Delhi, 2000.*
4. *GorakhPrased Differential Calculus, Pothishala Private Ltd. Allahabad, 19th Edition, 2016*
5. Shanti Narayan and P.K. Mittal: A Text Book of Matrices, S. Chand & Co., NewDelhi, Revised Edition, 2007