

**B.Sc. C.S.M. I**  
**Semester-1**  
**BCSMCC(C)-101: COMPUTER FUNDAMENTALS**  
**(Common for B.Sc. Non Medical/ B.Sc. CSM/ B.A.)**

**Credits: 4**

**External Examination: 75**

**Internal Assessment:25**

**INSTRUCTIONS FOR THE PAPER SETTER**

The question paper will consist of three Units I, II & III, Each Unit I, II will have four questions from the respective Units of the syllabus. Each will have 12 marks. Unit III will consist of one compulsory question having 9 Questions of short-answer type covering the entire syllabus uniformly. All the questions will carry 3 marks.

**INSTRUCTIONS FOR THE CANDIDATES**

Candidates are required to attempt five questions in all; selecting two question from each Unit I & II and the compulsory question of Unit III. All the questions will carry equal marks.

**Objective:** To learn basic principles of Computer system. To learn basic of word processing , spreadsheet and presentation. To be able to access the Internet, and internet application

**Unit-I**

**Computer Introduction:** Definition, Characteristics, Classification, Generations and Application of Computer.

**Number System:** Binary, Octal and Hexadecimal Conversion, Binary Arithmetic.

**Computer codes:** BCD, Gray Code, Excess- 3 code ,ASCII, EBCDIC, Unicode etc.

**Boolean Algebra and Logic gates:** Boolean operations, Boolean expressions, Minimizations, Logic Gates, Logic Circuits.

**Computer Organization:** CPU, Registers, Instructions set, Instruction Cycles.

**I/O Devices:** Keyboard, Mouse, Scanner, OMR, MICR, Video Cameras, Monitors, Printers : Dot Matrix, Inkjet, Laser, Plotters, Multimedia Projector.

**Unit-II**

**Memories:** RAM, ROM, Cache, Secondary storage Devices: Floppy disk, Hard disk, Compact disk, DVD.

**Computer Software:** Types of Software, firmware.

**Computer Languages:** Machine Language, Assembly Language, High Level Language, 4GL, Translators, Interpreters, Compilers, Assemblers.

**Computer Network:** Introduction, Transmission Modes, Transmission Media, Network Devices, Network Topologies, Types of Network Network Security.

**Internet and its Applications:** Web browser, email, World Wide Web, searching on the web, video conferencing.

**TEXT BOOKS:**

1. Anita Goel, Computer Fundamentals, Pearson.
2. P.K. Sinha and P. Sinha, Foundations of Computing, First Edition, BPB.
3. R.K.Chopra, "Office Organization and Management"

**REFERENCES**

1. V. Rajaraman, "Fundamentals of Computers", Prentice Hall of India.
2. B. Ram, "Computer Fundamentals", Wiley Publications.

**B.Sc. CSM I**  
**Semester-1**  
**BCSMCC(C)-101(A)**  
**SOFTWARE LAB BASED ON OFFICE AUTOMATION TOOLS**  
**(Common for B.Sc. Non Medical/ B.Sc. CSM/ B.A.)**

**Credits:2**

**External Marks:50**

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 breakup of marks for the University Examination will be as under:

Viva-voce:10

Exercises:20

Lab. Record:20

**Office Automation :** Introduction, Today's office, need for office automation, its advantages, disadvantages and office automation tools.

**Word Processing :** Formatting Text, Pages, Lists, Tables, Mail Merge.

**Spreadsheets:** Worksheets, Formatting data, creating charts and graphs, using formulas and functions, macros, Pivot Table

**Presentation Tools:** Adding and formatting text, pictures, graphic objects, including charts, objects, formatting slides, notes, handouts, slideshows, using transitions, animations

**Internet:** Using Internet, Browser, Email, Search Engines.

**B.Sc. C. S. M.-I**  
**SEMESTER-I**  
**BCSMCC(S)-102 STATISTICAL METHODS**

L T P  
4 0 0

Max. Marks: 75  
External Examination: 55  
Internal Assessment: 20  
Minimum pass marks: 35%

**INSTRUCTION FOR THE PAPER SETTER/Candidate**

The Question paper will consist of three Sections A, B and C. Sections A and B will have four questions from respective sections of the syllabus. Each will have 09 marks. The students are required to attempt two questions from each section. Section C will be compulsory have only one question which will consist of at-least ten short answer type parts covering the whole syllabus. This question carries 19 marks.

Use of scientific non-programmable calculator is allowed.

**SECTION - A**

**Introduction to Statistics:** Meaning and scope, advantages and disadvantages of Statistics, Collection of data: Primary and secondary data (Methods of collecting primary and secondary data), Designing a questionnaire. Diagrammatical representation of data, frequency distribution . **Graphical representation of data:** Histogram, Frequency Polygon, Frequency Curves and Ogives, Stem and Leaf diagram .

**Analysis of Quantative Data:** Measures of Central tendency and Dispersion, Properties of ideal measures of Central Tendency, Types of averages:- A.M.,G.M., H.M., Median, Mode, Range, Mean Deviation, Standard Deviation, Variance and coefficient of variation.

Measures of Skewness, Definition of Skewness, Karl-Pearson's coefficient of Skewness, Bowley's coefficient of Skewness, Kurtosis, Sheppard's correction for moments (without derivation)

**SECTION - B**

**Correlation and Regression :** Methods of Studying Correlation, Karl Pearson's Coefficient of correlation, Properties and Correlation of Determination, Spearman's rank Correlation Coefficient, Applications based on Correlation. Principle of least square, Fitting of Linear Regression, Curve Fitting: Polynomial Regression, Exponential Regression and Geometric Regression.

**Index Numbers:** Definition, Interpretation and Applications of Index Numbers, Problems involved in the construction of Index Numbers, Laspeyre's, Paasche's, Marshal-Edgeworth and Fisher's formulae for Index Numbers, Criterion of Good Index Number.

**Time Series:** Definition, Components of Time Series, Measurement of Secular Trend by method of Moving Average and fitting of mathematical Curves.

**Text Books**

1. Goon, A.M., Gupta, M.K., Dasgupta, B. Fundaments of Statistics, Vol. I, 2013, World Press Calcutta.
2. Goon, A.M., Gupta, M.K., Dasgupta, B. Fundaments of Applied Statistics, Vol.II, 2008, World Press Calcutta.
3. S.C.Gupta : Statistical Methods ,Sultan Chand & Sons Educational Pub. New Delhi.

**B.Sc. C. S. M.-I  
SEMESTER-I**

**BCSMCC(S)-102 (A): PRACTICAL OF STATISTICAL METHODS**

Credits:2

Max. Marks: 25

External Marks: 25

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. Use of scientific non-programmable calculator is allowed.

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

Practical. Record: 04

Viva-voice: 06

Exercises: 15

**Practical Course:**

The examination will be based on the syllabus of the papers CSM-104(Statistical Methods).

**LIST OF PRACTICALS:**

1. Problem Based on Measures of Central Tendency:
  - i) Mean
  - ii) Median
  - iii) Mode
  
4. Problem Based on Measures of Dispersion:
  - i) Range
  - ii) Standard Deviation
  - iii) Mean Deviation
  
5. Measures of Skewness
6. Measures of Kurtosis.
7. Problem based on:
  - i) Karl Pearson's coefficient of correlation.
  - ii) Spearman's Rank coefficient of correlation
  
8. Principle of least square
9. Fitting of linear regression.

**B. Sc. C. S. M.-I  
SEMESTER-I**

**BCSMCC(M)-103 MATRICES & CALCULUS  
(Common for B.Sc. Non Medical/ B.Sc. CSM/ B.A.)**

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5 1 0

Max. Marks: 100  
External Examination: 75  
Internal Assessment: 25  
Minimum pass marks: 35%

**INSTRUCTION FOR THE PAPER SETTER**

The question paper will consists of three sections A, B & C. Each of section A, B will have four questions from the respective syllabus. Each will consist of twelve marks. Section C will have one compulsory question having nine parts of short-answer type covering the entire syllabus uniformly. Each will consist of three marks.

**INSTRUCTION FOR THE CANDIDATES**

Candidates are required to attempt five questions in all; selecting two questions from each section A & B. Section C is compulsory.

**SECTION A**

Matrices, Algebra of Matrices, Symmetric, Skew symmetric, Hermitian and Skew Hermitian Matrices, Inverse of a matrix, Echelon and Normal forms of matrix, rank of matrices, Applications of matrices to systems of linear equations (both homogeneous and non-homogeneous), Eigen values and Eigen vectors, Characteristic Polynomial, minimal polynomial, Cayley Hamilton theorem and its use in finding inverse of a matrix, Diagonalization, Quadratic forms, Jordan Canonical form.

**SECTION B**

$\epsilon - \delta$  Definition of the limit of a function. Basic properties of limits. Continuous functions and Classification of Discontinuities, Uniform Continuity, Differentiability, Mean Value Theorems, Curvature, Envelope and Evolutes, Test for Concavity. Points of Inflexion, Singular Points, Asymptotes. Tracing of Curves (Cartesian & Polar)

**TEXT BOOKS:**

1. K. B. Datta: Matrix and Linear Algebra, PHI, New Delhi 2000.
2. S. Lang: Linear Algebra, Undergraduate Texts in Mathematics, Springer-Verlag, New York, 1989.
3. Schaum's Outlines 2006: Linear Algebra, Tata McGraw-Hill Edition, 3rd Ed., 2006.
4. P.B. Bhattacharya, S. K. Jain & S. R. Nagpaul: First course in Linear Algebra, Wiley Eastern, New Delhi, 1983.
5. G. B. Thomas and R. L. Finney: Calculus and Analytic Geometry, 9th Ed., Addison Wesley, 1998.

**B.Sc. CSM I**  
**Semester-II**  
**BCSMCC(C)-201: COMPUTER PROGRAMMING USING C**  
**(Common for B.Sc. Non Medical/ B.Sc. CSM/ B.A.)**

**Credits:4**

**External Examination:75**

**Internal Assessment:25**

**INSTRUCTIONS FOR THE PAPER SETTER**

The question paper will consist of three Units I, II & III, Each Unit I, II will have four questions from the respective Units of the syllabus. Each will have 12 marks. Unit III will consist of one compulsory question having 9 Questions of short-answer type covering the entire syllabus uniformly. All the questions will carry 3 marks.

**INSTRUCTIONS FOR THE CANDIDATES**

Candidates are required to attempt five questions in all; selecting two question from each Unit I & II and the compulsory question of Unit III. All the questions will carry equal marks.

**Objective:** Understand fundamentals of programming such as variables, conditional and iterative execution, methods, etc. To be aware of the important topics and principles of software development. To Have the ability to write a computer program to solve specific problems.

**UNIT-I**

**Program Planning:** Algorithms, characteristics and Examples of algorithms, Flowcharts, symbols used in flowcharts, Examples of flowcharts, Pseudocode

**Programming Fundamentals:** character set, Identifiers and keywords, constants, variable.

**Data Types:** Declaring(integer, float and character), Defining and Initializing Variables, Scope of Variables, Using Named Constants, Casting of Data Types, Storage Classes

**Operators and expressions:** Arithmetic, Unary, Logical and Relational operators, assignment operators, Conditional operators.

**Control statements:** Branching constructs, looping constructs, nested control structures, switch, break and continue statements.

**Arrays:** one dimensional and two dimensional arrays, Strings: input/output of strings, string handling functions,

**UNIT-II**

**Functions:** Prototype, definition and call, formal, actual and default arguments, methods of parameter passing to functions, recursive function, Function overloading .

**Pointers:** pointer data type, pointer declaration, initialization, accessing values using pointers, pointer arithmetic, pointers and arrays.

**Structure and Union:** using structures and unions, structure in arrays and array in structures. Comparison of structure and union.

**Files :** opening and closing files, file I/O functions, text and binary files.

**Text Book:**

1. E. Balagurusamy, "Programming in C", Tata McGraw Hill

**References:**

1. Yashwant Kanetkar, "Let Us C", BPB Publications.
2. Kamthane, "Programming with ANSI and Turbo C", Pearson Education

**B.Sc. CSM I  
Semester-II**

**BCSMCC(C)-201(A): SOFTWARE LAB BASED ON COMPUTER PROGRAMMING  
(Common for B.Sc. Non Medical/ B.Sc. CSM/ B.A.)**

**Credits:2**

**External Marks:50**

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 breakup of marks for the University Examination will be as under:

Viva-voce:10 Exercises:20 Lab. Record:20

**Practical Based on Paper Computer Programming**

**List of Programs**

1. WAP to print the sum and product of digits of an integer.
2. WAP to reverse a number.
3. WAP to compute the sum of the first n terms of the following series  
 $S = 1 + 1/2 + 1/3 + 1/4 + \dots$
4. WAP to compute the sum of the first n terms of the following series  
 $S = 1 - 2 + 3 - 4 + 5 - \dots$
5. Write a function that checks whether a given string is Palindrome or not. Use this function to find whether the string entered by user is Palindrome or not.
6. Write a function to find whether a given no. is prime or not. Use the same to generate the prime numbers less than 100.
7. WAP to compute the factors of a given number.
8. Write a macro that swaps two numbers. WAP to use it.
9. WAP to perform following actions on an array entered by the user:
  - i) Print the even-valued elements
  - ii) Print the array in reverse order
10. Write a program that swaps two numbers using pointers.
11. Write a program in which a function is passed address of two variables and then alter its Contents.



**B.Sc. C. S. M.-I  
SEMESTER-II  
BCSMCC(S) – 202: PROBABILITY THEORY**

L T P  
4 0 2

Max. Marks: 75  
External Examination: 55  
Internal Assessment: 20  
Minimum pass marks: 35%

**INSTRUCTION FOR THE PAPER SETTER**

The question paper will consist of three sections A, B & C, Each section A, B will have four questions from the respective sections of the syllabus. Each will have 10 marks. Section C will consist of one compulsory question having five parts of short-answer type covering the entire syllabus uniformly. All the questions will carry equal marks.

**INSTRUCTION FOR THE CANDIDATES**

Candidates are required to attempt five questions in all; selecting two question from each section A & B and the compulsory question of section C. All the questions will carry equal marks.

**SECTION – A**

**Important concepts in probability:** Sample space, Events, Relative Frequency, Basic definition and concepts of Probability.

Mathematical and Axiomatic Approach of probability, Bayes' theorem and its applications. Conditional probability.

**One dimensional and Two dimensional Random Variable:** General notation, definition of discrete random variables, probability mass function, continuous random variable, probability density function, cumulative distribution function, Marginal and Conditional Probability, Independent random variable, Function of Random Variables, Distribution of Product and Quotient of Independent Random Variables.

**SECTION - B**

**Moment Generating Function:** (Examples and properties only)

**Discrete Distributions:** Binomial, Poisson, Hyper-geometric, Geometric and Negative Binomial Distribution.

**Continuous Distribution:** Normal Distribution, Properties of Normal Distribution, Tabulation of Normal Distribution, Normal approximation to Binomial and Poisson, Reproductive properties of moment generating function, Exponential distribution and its properties.

**Text Books:**

1. Goon, A.M., Gupta, M.K., Dasgupta, B. Fundamentals of Statistics, Vol. I, 2013, World Press Calcutta
2. Meyer, P.L. Introductory Probability and Statistical Applications, 1970, Wesley.

**B.Sc. C. S. M.-I**  
**SEMESTER-II**  
**BCSMCC(S) – 202(A): PRACTICAL OF PROBABILITY THEORY**

Credits: 2

Max. Marks: 25

External Examination: 25

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. Use of scientific non-programmable calculator is allowed.

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

Lab. Record: 04  
Viva-voice: 06  
Exercises: 15

**Lab Course:**

The examination will be based on the syllabus of the papers CSM-204(Probability Theory)

**LIST OF PRACTICALS:**

1. Problem Based on Discrete Distribution:
  - i) Fitting of Binomial Distribution
  - ii) Fitting of Poisson Distribution
  - iii) Fitting of Geometric Distribution
  - iv) Fitting of Negative-Binomial Distribution
  
2. Problem Based on Normal Distribution.

**B.Sc. C. S. M.-I  
SEMESTER-II**

**BCSMCC(M)-203 THEORY OF EQUATIONS & ORDINARY DIFFERENTIAL  
EQUATIONS**

**(Common for B.Sc. Non Medical/ B.Sc. CSM/ B.A.)**

L T P  
5 1 0

Max. Marks: 100  
External Examination: 75  
Internal Assessment: 25  
Minimum pass marks: 35%

**INSTRUCTION FOR THE PAPER SETTER**

The question paper will consist of three sections A, B & C. Each of section A, B will have four questions from the respective syllabus. Each will consist of twelve marks. Section C will have one compulsory question having nine parts of short-answer type covering the entire syllabus uniformly. Each will consist of three marks.

**INSTRUCTION FOR THE CANDIDATES**

Candidates are required to attempt five questions in all; selecting two questions from each section A & B. Section C is compulsory.

**SECTION A**

Relations between roots and coefficients of a general polynomial, Transformation of equation. Descartes' rule of signs, Solution of cubic equations, Biquadratic equations and their solution, De Moivre's theorem and its applications, Direct and inverse circular functions, hyperbolic and logarithmic functions, Summation of series.

**SECTION B**

Exact differential equations, First order and higher degree differential equations: Equations solvable for  $x$ ,  $y$  &  $p$ , Clairaut's equation, reducible to Clairaut's equation, Approximations to first order differential equations: Lipschitz condition, Successive approximation.

Wronskian, Second order Differential Equations: Linear equations with constant coefficients, Standard methods for solution, Non-homogeneous linear with constant coefficients, Linear equations with variable coefficients, Method of variation of parameter, Method of method of Undetermined coefficients, Linear Independence, Linear dependence,

Series solution: Ordinary points, Regular Singular Points, Power series method, Method of Frobenius & its Applications.

**TEXT BOOKS:**

1. Scham outline Series, Linear Algebra, Third Edition, McGraw Hill Education, 2017.
2. S. L. Loney, Trigonometry, Arihant Publications, 2016.
3. Chandrika Prasad, Text Book of Algebra, Pothishala Private Ltd. Allahabad.

4. Sharma and Shah Pearson, Algebra-I, Pearson Education, 2011.
5. G. F. Simmons, Pre Calculus Mathematics in a Nutshell, Resource Pubns, 2003.
6. W. E. Boyce and P. C. Diprima: Elementary Differential Equations and Boundary value problems, John Wiley, 1986.
7. L. R. Shepley: Differential Equations, Wiley-India, 3<sup>rd</sup> Ed.
8. R. K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publishing House.
9. Zafar Ahsan, Differential Equations and Their Applications, Prentice-Hall of India Pvt., Ltd., New Delhi, 2<sup>nd</sup> Ed.
10. M. D. Rai Singhania: Ordinary and Partial Differential Equations, S. Chand & Company, New Delhi.