

**B.A./B.Sc. (Semester System) (12+3 System of Education)**  
**SEMESTER-I**

**COMPUTER SCIENCE**  
**COMPUTER FUNDAMENTAL & INFORMATION TECHNOLOGY**

**Time: 3 Hours**  
**4Hours/week**

**Total Marks: 100**  
**Theory Marks: 56**  
**Theory Internal Assessment M: 19**  
**Practical Marks: 18**  
**Practical Internal Assessment M: 07**

**Note: 1. Medium of Examination is English Language.**

**2.The question paper covering the entire course shall be divided into three sections.**

**Section A:** It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length.

The total weightage being **12 marks**.

**Section B:** It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks.

The total weightage of this section shall be **22 marks**.

**Section C:** It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks.

The total weightage of this section shall be **22 marks**

**UNIT-I**

**Introduction to computer and its uses:** milestones in hardware and software, batch oriented/online/real time application.

**Computer as a system:** basic concepts, stored programs, functional units and their inter – relation, communication with the computer.

**Data storage devices and media:** primary storage: storage addressed, and capacity, type of memory: secondary storage; magnetic tape – data representation and R/W: magnetic disc, fixed & removable, data representation and R/W, Data organization, Compact Disc, DVD, Blu-ray Disc, Cloud Storage.

**Input/output devices:** Key–tape/diskette devices, light pen mouse and joystick, source data automation (MICR, OMR, and OCR), screen assisted data entry; portable/hand held terminals for data collection, vision input system, SD Cards (Secure Digital), Solid State drives (SSD) .

**Printed output:** Serial, line, page, printers; plotters, visual output; voice response units. Computer Viruses: Definition, Types of viruses, use of Antivirus software

**UNIT-II**

**Data & Network Communication**

Communication media: Twisted pair, Coaxial, Fibre optics, Wireless (Line of Sight & Satellite), Network Advantages, Types & Topologies, Communication using Network protocol/Network Interface card(NP/NIC), Transmission & Communication protocol/protocol(TCP/IP), Modems, Types of Operating systems: Multiuser, Multitasking & Multiprogramming and their examples.

**Information Systems**

Introduction to IT & its components, what is Information systems, Computer based information systems, Management Information System, Decision Support System, Expert System, Functional Information System, Open Information System, Transaction Processing System, System Development Process & System development Tools. Internet basics, Its uses and Applications.

**References:**

1. R.K. Taxali: Introduction to Software Packages, Galgotia Publications.
2. Introduction to Computer by P.K. Sinha
3. Windows Based Computer Courses by Gurvinder Singh & Rachpal Singh.
4. Peter Norton, Introduction to Computers, Glencoe, Macmillan/McGraw Hill. Kroenke, Business Computer System, McGraw Hill.
5. Patric, G.Mckeown, Living with the Computers, 2nd edition, HBT Publishers, USA.
6. Hussain & Hussain, Computer Technology, Applications & Social Implications, PHI.
7. MS-Office compiled by SYBIX
8. MS-Office BPB Publications.

**B.A./B.Sc. (Semester System) (12+3 System of Education)  
SEMESTER-I**

**(PRACTICAL)**

**Time: 3 hours**

**Practical Marks: 18  
Practical Internal Assessment M: 07**

**2Hours/week**

**Practical based on COMPUTER FUNDAMENTAL & INFORMATION TECHNOLOGY**

**Working of Internet:**

Internet and Internet application Introduction, Internet evolution Working of Internet, Use of Internet Overview of World Wide Web (Web Server and Client) , Introduction to Search engine and Searching the Web Downloading files, Introduction to Web Browsers Working with E-mail.

**MS-Word 2010:**

Introduction to Word, Introduction to Parts of Word Window (Title Bar, Menu Bar, Tool Bar, The Ruler, Status Area), Page Setup, Creating New Documents, Saving Documents, opening an Existing documents, insert a second document into an open document, Editing and formatting in document, Headers and Footers, Spell Checking, Printing document, Creating a Table Using the Table Menu and table formatting, Borders and Shading, Templates and Wizards, Mail Merge.

**MS Power Point 2010:**

Introduction to MS Power point, Power point elements, Templates, Wizards, Views, Exploring Power Point Menu, Working with Dialog Boxes, Adding Text, Adding Title, Moving Text Area, Resizing Text Boxes, Adding Art, Starting a New Slide, Starting Slide Show, Saving presentation; Printing Slides, Views (View slide sorter view, notes view, outlines view), Formatting and enhancing text formatting, Creating Graphs (Displaying slide show and adding multi-media)

**B.A. /B.Sc. (Semester System) (12+3 System of Education)**  
**SEMESTER-II**

**PROGRAMMING USING C**  
**(Theory)**

**Time: 3 Hours**  
**4Hours/week**

**Total Marks: 100**  
**Theory Marks: 56**  
**Theory Internal Assessment M: 19**  
**Practical Marks: 18**  
**Practical Internal Assessment M: 07**

**Note: 1. Medium of Examination is English Language.**

**2.The question paper covering the entire course shall be divided into three sections.**

**Section A:** It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.

**Section B:** It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks.

The total weightage of this section shall be **22 marks**.

**Section C:** It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks.

The total weightage of this section shall be **22 marks**

**UNIT-I**

Data Representation, Introduction to Number Systems and Character Codes, Flow Charts, Problem Analysis, decision tables, pseudo codes and algorithms.

**Programming Language C**

**Basics of C:** Introduction to C, Applications and Advantages of C, Tokens, Types of Errors

**Data Types:** Basic & Derived Data Types, User Defined Data Types, Declaring and initializing variables.

**Operators and Expressions:** Types of operators (Unary, Binary, Ternary), Precedence and Associativity

**Data I/O Functions:** Types of I/O function, Formatted & Unformatted console I/O Functions

**Control Statements:** Jumping, Branching and Looping–Entry controlled and exit controlled, Advantages/Disadvantages of loops, difference between for, while and do–while.

**UNIT-II**

**Arrays:** Types of Arrays, One Dimensional and Two Dimensional Arrays.

**Strings:** Introduction to Strings and String functions, array of strings.

**Functions:** User Defined & Library Function, Function (Prototype, Declaration, Definition), Methods of passing arguments, local and global functions, Recursion.

**Storage Classes:** Introduction to various storage classes, scope and lifetime of a variable, Storage class specifiers (auto, register, static, extern), advantages and disadvantages.

**Structure and Union:** Introduction to structure and union, pointers with structure

**Books Suggested:**

- (i) Programming with C Languages C. Schaum Series.
- (ii) Yashwant Kanetkar – Let Us C
- (iii) C Programming by Stephen G Kochan

**B.A. /B.Sc. (Semester System) (12+3 System of Education)**  
**SEMESTER-II**

**(PRACTICAL)**

**Time: 3 Hours**  
2Hours/week

Practical based on Programming in C

**B.A. /B.Sc. (Semester System) (12+3 System of Education)**  
**SEMESTER-III**  
**COMPUTER SCIENCE**  
**Computer Oriented Numerical and Statistical Methods**  
**(Theory)**

**Time: 3 Hours**  
**4Hours/week**

**Total Marks: 100**  
**Theory Marks: 56**  
**Theory Internal Assessment M: 19**  
**Practical Marks: 18**  
**Practical Internal Assessment M: 07**

**Note: 1. Medium of Examination is English Language.**

**2.The question paper covering the entire course shall be divided into three sections.**

**Section A:** It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.

**Section B:** It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks**.

**Section C:** It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks**.

**UNIT-I**

- 1 Numerical method, Numerical methods versus numerical analysis, Errors and Measures of errors.
- 2 Non-linear Equations, Iterative Solutions, Multiple roots and other difficulties, Interpolation methods, Methods of bisection, False position Method, Newton Raphson-method.
- 3 Simultaneous Solution of Equations, Gauss Elimination Method, Gauss Jordan method. Gauss Siedel Method, Matrix Inversion Method.
- 4 Interpolation and Curve Fitting, Lagrangian Polynomials, Newton Methods: Forward Difference Method, Backward Difference Method Divided Difference Method.
- 5 Numerical Integration and Different Trapezoidal Rule, Simpson's 1/3 Rule Simpson's 3/8 Rule.

**UNIT II**

**Numerical differentiation by Polynomial Fit Statistical Techniques**

- 1 Measure of Central Tendency, preparing frequency distribution table, Mean Arithmetic, mean geometric, Mean harmonic, Mean median Mode.
- 2 Measure of dispersion, Skewness and Kurtosis Range, Mean deviation, Standard deviation, Co-efficient of variation, Moments Skewness Kurtosis.
1. Correlation Bivariate Distribution Multivariate distribution.
2. Regression B.C., Linear Regression, Multiple Regression.
3. Trend Analysis least square fit linear trend, Non-linear trend

$$Y=ax^b$$
$$Y=ab^x$$
$$Y=ae^{bx}$$

Polynomial fit:  $Y= a+bx+cx^2$

**Books Recommended:**

- 1 B.S. Grewal: *Numerical Methods for Engineering*, Sultan Chand Publications.
- 2 V. Rajaraman: *Computer Oriented Numerical Methods*, Prentice Hall of India Private Ltd.

**B.A./B.Sc. (Semester System) (12+3 System of Education)**

**SEMESTER–III**

**COMPUTER SCIENCE**

**Computer Oriented Numerical and Statistical Methods Lab.**

Practical based on Computer Oriented Numerical and Statistical Methods.

**B.A. /B.Sc. (Semester System) (12+3 System of Education)  
SEMESTER-IV**

**COMPUTER SCIENCE  
Data Structures & Programming Language Using C++  
(Theory)**

**Time: 3 Hours  
4 Hours/week**

**Total Marks: 100  
Theory Marks: 56  
Theory Internal Assessment Marks: 19  
Practical Marks: 18  
Practical Internal Assessment Marks: 07**

**Note: 1. Medium of Examination is English Language.**

**2. The question paper covering the entire course shall be divided into three sections.**

**Section A:** It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.

**Section B:** It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks**.

**Section C:** It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks**.

**UNIT I**

**Data Structure:** Introduction to elementary Data Organization, Common Operation on Data Structures, Algorithm Complexity, Big O Notation, Time-Space Trade-off between Algorithm.

**Arrays:** Array Defined, Representing Arrays in memory, Various operations on Linear arrays, Multi-Dimensional arrays.

**Object Oriented Programming:** objects & classes, constructor & destructor, operator overloading, overloading unary operators, overloading binary operators, data conversion, Pitfalls of operator overloading and conversion, Inheritance, Derived class and base, Derived class constructor. Overloading member functions, Inheritance in the English distance class, class hierarchies, Public & Private inheritance, Level of inheritance, Polymorphism, problems with single inheritance, multiple inheritance.

**UNIT II**

**Linked Lists:** Types of Linked Lists, representing linked list in memory, advantages of using linked lists over arrays, Various operations of linked lists.

**Stacks:** Description of STACK structure, Implementation of stack, using arrays and linked lists, application of stack-converting Arithmetic expression from infix notational to polish and their subsequent evaluation, quicksort technique to sort an array.

**Queues:** Description of queue structure, Implementation of queue using arrays and linked lists, description or priorities of queues, dequeues.

**Sorting and Searching:** Sorting Algorithms, bubble sort, selection sort, insertion sort, quick sort, merge sort, heap sort, searching Algorithms, linear search and binary search.

**References:**

1. Seymour Lischutz, *Theory and Problems of Data Structures*.
2. *Schaum's Outline Series*, McGraw Hill Company.
3. Tanenbaum, *Data Structure*



**B.A./B.Sc. (Semester System) (12+3 System of Education)  
SEMESTER-IV**

**COMPUTER SCIENCE**

**Data Structures & Programming Language Using C++ Lab**

**2 Hours/week**

Practical based on Data Structures & Programming Language Using C++

**B.A./B.Sc.(Semester System) (12+3 System of Education)  
Semester V**

**Computer Science  
Data Base Management System & Oracle**

**Time: 3 Hours  
4Hours/week**

**Total Marks: 100  
Theory Marks: 56  
Theory Internal Assessment M: 19  
Practical Marks: 18  
Practical Internal Assessment M: 07**

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**Section B:** It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks.

The total weightage of this section shall be **22 marks**.

**Section C:** It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks.

The total weightage of this section shall be **22 marks**

**UNIT-I**

**DBMS**

Introduction to database management system, components of DBMS, ER. Diagrams, Data Description Language, Data Manipulation Language, SQL.

Data Models: Hierarchical Model, Network Model and Relational Model, Relational Databases. Relational Algebra and Calculus Normalisation.

Database Security, Protection, Integrity, Recovery, Concurrency, Control, Decomposition. Distributed Databases, Knowledge Base/Expert Systems and Object Oriented Databases.

**UNIT-II**

**Oracle 10g**

**SQL \* PLUS**

Introduction to Oracle 10

SQL - DDL, DML, DCL.

Join methods & Sub query, Union, Intersection.

Built in Functions, View Security amongst users, Sequences, indexing object features of Oracle 10.

**PL/SQL**

Introduction to PL/SQL.

Cursors - Implicit & Explicit.

Procedures, Functions & Packages.

Database Triggers.

**References:**

1 Desai B.C.: An Introduction to Database Systems, Galgotia Publishers.

2 Date C.J. An Introduction to Database Systems, Vol. I, Narosa Publishers.

**B.A. /B.Sc. (Semester System) (12+3 System of Education)  
SEMESTER-V**

**COMPUTER SCIENCE  
Database Management System and Oracle  
(Practical)**

**2 Hours/week**

Practical based on Database System and Oracle

**B.A. /B.Sc. (Semester System) (12+3 System of Education)**

**B.A. /B.Sc. Semester VI**

**Computer Science**

**Programming using Python**

**Time: 3 Hours**  
**4Hours/week**

**Total Marks: 100**  
**Theory Marks: 56**  
**Theory Internal Assessment M: 19**  
**Practical Marks: 18**  
**Practical Internal Assessment M: 07**

**Note: 1. Medium of Examination is English Language.**

**2.The question paper covering the entire course shall be divided into three sections.**

**Section A:** It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.

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**Section C:** It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks.

The total weightage of this section shall be **22 marks**

**UNIT-I**

**Introduction to Python:** Process of Computational Problem Solving, Python Programming Language

**Data and Expressions:** Literals, Variables and Identifiers, Operators, Expressions, Statements and Data Types

**Control Structures:** Boolean Expressions (Conditions), Logical Operators, Selection Control, Nested conditions, Debugging

**Lists:** List Structures, Lists (Sequences) in Python, Iterating Over Lists (Sequences) in Python

**Functions:** Fundamental Concepts, Program Routines, Flow of Execution, Parameters & Arguments

**Iteration:** While statement, Definite loops using for, Loop Patterns, Recursive Functions, Recursive Problem Solving, Iteration vs. Recursion

**UNIT-II**

**Dictionaries:** Dictionaries and Files, Looping and dictionaries, Advanced text parsing

**Files:** Opening Files, Using Text Files, String Processing, Exception Handling

**Objects and Their Use:** Introduction to Object Oriented Programming

**Modular Design:** Modules, Top-Down Design, Python Modules

**Using Databases and SQL:** Database Concepts, SQLite Manager Firefox Add-on, SQL basic summary, Basic Data modeling, Programming with multiple tables

**Reference Books:**

1. Python for Informatics, Charles Severance, version 0.0.7
2. Introduction to Computer Science Using Python: A Computational Problem-Solving Focus, Charles Dierbach, Wiley Publications, 2012, ISBN : 978-0-470-91204-1
3. Introduction To Computation And Programming Using Python, GUTTAG JOHN V, PHI, 2014, ISBN-13: 978-8120348660
4. Introduction to Computing & Problem Solving Through Python, Jeeva Jose and Sojan P. Lal, Khanna Publishers, 2015, ISBN-13: 978-9382609810
5. Introduction to Computing and Programming in Python, Mark J. Guzdial, Pearson Education, 2015, ISBN-13: 978-9332556591
6. Fundamentals of Python by Kenneth Lambert, Course Technology, Cengage Learning , 2015
7. Learning Python by Mark Lutz, 5th Edition, O'Reilly Media, 2013

**B.A. /B.Sc. (Semester System) (12+3 System of Education)**  
**SEMESTER-VI**

**COMPUTER SCIENCE**  
**Programming using Python**

**Practical**

**2 Hours/week**

Practical based on Programming using Python.