



**NEP-2021**

**CURRICULUM STRUCTURE AND SYLLABUS**

**Bachelor of Science (Basic and Honors) Programmes with  
Computer Science as Major and Minor Courses**

**And**

**Open Elective courses in Computer Science**

**w.e.f Academic Year 2021-22 onwards**

## **The objectives of the Program**

1. The primary objective of this program is to provide a foundation of computing principles for effectively using information systems and enterprise softwares.
2. It helps students analyze the requirements for system programming and exposes students for information systems
3. This programme provides students with options to specialize in various software system.
4. To produce outstanding Computer Scientists who can apply the theoretical knowledge into practice in the real world and develop standalone live projects themselves
5. To provide opportunity for the study of modern methods of information processing and its applications.
6. To develop among students the programming techniques and the problem-solving skills through programming
7. To prepare students who wish to go on to further studies in computer science and related subjects.
8. To acquaint students to Work effectively with a range of current, standard, OfficeProductivity software applications

## Program Outcomes

1. **Discipline knowledge:** Acquiring knowledge on basics of Computer Science and ability to apply to design principles in the development of solutions for problems of varying complexity
2. **Problem Solving:** Improved reasoning with strong mathematical ability to Identify, formulate and analyze problems related to computer science and exhibiting a sound knowledge on data structures and algorithms.
3. **Design and Development of Solutions:** Ability to design and development of algorithmic solutions to real world problems.
4. **Programming a computer:** Exhibiting strong skills required to program a computer for various issues and problems of day-to-day scientific applications.
5. **Application Systems Knowledge:** Possessing a minimum knowledge to practice existing computer application software.
6. **Communication:** Must have a reasonably good communication knowledge both in oral and writing.
7. **Ethics on Profession, Environment and Society:** Exhibiting professional ethics to maintain the integrality in a working environment and also have concern on societal impacts due to computer-based solutions for problems.
8. **Lifelong Learning:** Should become an independent learner. So, learn to learn ability.
9. **Motivation to take up Higher Studies:** Inspiration to continue educations towards advanced studies on Computer Science.

## **Additional Program Outcomes for B.Sc (Hons) in Computer Science**

The four years Bachelors in Computer Science (Hons) program enables students to attain the following additional attributes besides the afore-mentioned attributes:

1. Apply standard Software Engineering practices and strategies in real -time software project development
2. Design and develop computer programs/computer-based systems in the areas related to AI, algorithms, networking, web design, cloud computing, IoT and data analytics.
3. Acquaint with the contemporary trends in industrial/research settings and thereby innovate novel solutions to existing problems
4. The ability to apply the knowledge and understanding noted above to the analysis of a given information handling problem.
5. The ability to work independently on a substantial software project and as an effective team member.

# Curriculum Structure

Program: B.Sc. (Basic and Honors) Subject: Computer Science

## 1. Computer Science as MAJOR with another Subject as MINOR (Table IIA of Model Curriculum)

Sem	Discipline Specific Core Courses (DSC)	Hour of Teaching/ Week		Discipline Specific Elective Courses (DSE)/ Vocational Courses (VC)	Hour of Teaching/ Week
		Theory	Lab		
1	DSC-1: Computer Fundamentals and Programming in C <b>DSC-1Lab:</b> C Programming Lab	4	4		
2	DSC-2: Data Structures using C <b>DSC-2Lab:</b> Data structures Lab	4	4		
3	DSC-3: Object Oriented Programming Concepts and Programming in JAVA <b>DSC-3Lab:</b> JAVA Lab	4	4		
4	DSC-4: Database Management Systems <b>DSC-4Lab:</b> DBMS Lab	4	4		
5	DSC-5: Programming in PYTHON DSC-6: Computer Networks <b>DSC-5Lab:</b> PYTHON Programming lab <b>DSC-6Lab:</b> Computer Networks Lab	3 3	4 4	VC-1: Any one from Vocational Courses, Group – 1*	3
6	DSC-7: Internet Technologies DSC-8: Operating System Concepts <b>DSC-7Lab:</b> JAVA Script, HTML, CSS Lab <b>DSC-8Lab:</b> C# Programming Lab	3 3	4 4	VC-2: Any one from Vocational Courses, Group – 2* <b>Internship:</b>	3 2
7	DSC-9: Computer Graphics and Visualization DSC-10: Design and Analysis of Algorithms DSC-11: Software Engineering <b>DSC-9Lab:</b> Computer Graphics and Visualization <b>DSC-10Lab:</b> Algorithms Lab	3 3 3	4 4	DSE-1: Any one from Discipline Specific Elective Courses, Group – 1** DSE-2: Any one from Discipline Specific Elective Courses, Group – 2** <b>Research Methodology:</b>	3 3 3
8	DSC-12: Artificial Intelligence and Applications DSC-13: Computer Organization and Architecture  DSC-14: Data Warehousing and Data Mining <b>DSC-12Lab:</b> AI Lab	3 3  3	4	DSE-3: Any one from Discipline Specific Elective Courses, Group – 3** <b>Research Project:</b>	3 6

**2. Computer Science as MINOR with another Subject as MAJOR (As per Table IIA of Model Curriculum)**

Sem	Discipline Specific Core Courses (DSC)	Hour of Teaching/ Week	
		Theory	Lab
1	DSC-1: Computer Fundamentals and Programming in C DSC-1Lab: C Programming Lab	4	4
2	DSC-2: Data Structures using C DSC-2Lab: Data structures Lab	4	4
3	DSC-3: Object Oriented Programming Concepts and Programming in JAVA DSC-3Lab: JAVA Lab	4	4
4	DSC-4: Database Management Systems DSC-4Lab: DBMS Lab	4	4
5	DSC-5: Programming in PYTHON DSC-5Lab: PYTHON Programming lab	3	4
6	DSC-6: Internet Technologies DSC-6Lab: JAVA Script, HTML, CSS Lab	3	4

**\* Vocational Courses:**

<p><b>Group-1:</b></p> <ul style="list-style-type: none"> <li>• DTP, CAD and Multimedia</li> <li>• Hardware and Server Maintenance</li> <li>• Web Content Management Systems</li> <li>• E-Commerce</li> <li>• Web Designing</li> </ul>	<p><b>Group-2:</b></p> <ul style="list-style-type: none"> <li>• Health Care Technologies</li> <li>• Digital Marketing</li> <li>• Office Automation</li> <li>• Multimedia Processing</li> <li>• Accounting Package</li> </ul>
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**\*\* Discipline Specific Elective Courses:**

<p><b>Group-1:</b></p> <ul style="list-style-type: none"> <li>• IoT</li> <li>• Cyber Law and Cyber Security</li> <li>• Web Programming - PHP and MySQL</li> <li>• Clouds, Grids, and Clusters</li> <li>• Software Testing</li> </ul>	<p><b>Group-2:</b></p> <ul style="list-style-type: none"> <li>• Information and Network Security</li> <li>• Data Compression</li> <li>• Discrete Structures</li> <li>• Opensource Programming</li> <li>• Multimedia Computing</li> <li>• Big Data</li> </ul>	<p><b>Group-3:</b></p> <ul style="list-style-type: none"> <li>• Data Analytics</li> <li>• Storage Area Networks</li> <li>• Pattern Recognition</li> <li>• Digital Image Processing</li> <li>• Parallel Programming</li> <li>• Digital Signal Processing</li> </ul>
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## Open Electives in Computer Science:

- Office Automation
- Computer Fundamentals
- Problem Solving and C Programming Concepts
- Python Programming Concepts
- Web Designing
- Accounting Package
- E-Commerce
- Multimedia Processing
- R Programming
- E-Content Development
- Computer Animation

# Syllabus for B.Sc (Basic and Honors) 1<sup>st</sup> and 2<sup>nd</sup> Semesters

## Semester: I

Course Code: DSC-1	Course Title: Computer Fundamentals and Programming in C
Course Credits: 04	Hour of Teaching/Week: 04
Total Contact Hours: 52	Formative Assessment Marks: 40
Exam Marks: 60	Exam Duration: 03

## Course Content

Content	Hours
<b>Unit - 1</b>	
<b>Fundamentals of Computers:</b> Introduction to Computers - Computer Definition, Characteristics Computers, Evolution and History of Computers, Types of Computers, Basic Organisation of a Digital Computer; Number Systems – different types, conversion from one number system to another; Computer Codes – BCD, Gray Code, ASCII and Unicode; Boolean Algebra – Boolean Operators with Truth Tables; Types of Software – System Software and Utility Software; Computer Languages - Machine Level, Assembly Level & High Level Languages, Translator Programs – Assembler, Interpreter and Compiler; Planning a Computer Program - Algorithm, Flowchart and Pseudo code with Examples. (at least 5hrs)	10
<b>Unit - 2</b>	
<b>Introduction to C Programming:</b> Over View of C; History and Features of C; Structure of a C Program with Examples; Creating and Executing a C Program; Compilation process in C. <b>C Programming Basic Concepts:</b> C Character Set; C tokens - keywords, identifiers, constants, and variables; Data types; Declaration & initialization of variables; Symbolic constants. <b>Input and output with C:</b> Formatted I/O functions - <i>printf</i> and <i>scanf</i> , control stings and escape sequences, output specifications with <i>printf</i> functions; Unformatted I/O functions to read and display single character and a string - <i>getchar</i> , <i>putchar</i> , <i>gets</i> and <i>puts</i> functions.	8
<b>Unit - 3</b>	
<b>C Operators &amp; Expressions:</b> Arithmetic operators; Relational operators; Logical operators; Assignment operators; Increment & Decrement operators; Bitwise operators; Conditional operator; Special operators; Operator Precedence and Associatively; Evaluation of arithmetic expressions; Type conversion.	12
<b>Control Structures:</b> Decision making Statements - <i>Simple if</i> , <i>if_else</i> , <i>nested if_else</i> , <i>else_if ladder</i> , <i>Switch-case</i> , <i>goto</i> , <i>break</i> & <i>continue</i> statements; Looping Statements - Entry controlled and exit controlled statements, <i>while</i> , <i>do-while</i> , <i>for</i> loops, Nested loops.	
<b>Unit - 4</b>	
<b>Arrays:</b> One Dimensional arrays - Declaration, Initialization and Memory representation; Two Dimensional arrays - Declaration, Initialization and Memory representation. <b>Strings:</b> Declaring & Initializing string variables; String handling functions - <i>strlen</i> , <i>strcmp</i> , <i>strcpy</i> and <i>strcat</i> ; Character handling functions - <i>toascii</i> , <i>toupper</i> , <i>tolower</i> , <i>isalpha</i> , <i>isnumeric</i> etc.	12



<b>Pointers in C:</b> Understanding pointers - Declaring and initializing pointers, accessing address and value of variables using pointers; Pointers and Arrays; Pointer Arithmetic; Advantages and disadvantages of using pointers;	
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<b>Unit - 5</b>	
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<b>User Defined Functions:</b> Need for user defined functions; Format of C user defined functions; Components of user defined functions - return type, name, parameter list, function body, return statement and function call; Categories of user defined functions - With and without parameters and return type. <b>User defined data types:</b> Structures - Structure Definition, Advantages of Structure, declaring structure variables, accessing structure members, Structure members initialization, comparing structure variables, Array of Structures; Unions - Union definition; difference between Structures and Unions.	10
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**Text Books**

1. Pradeep K. Sinha and Priti Sinha: Computer Fundamentals (Sixth Edition), BPB Publication
2. E. Balgurusamy: Programming in ANSI C (TMH)

**References**

1. Kamthane: Programming with ANSI and TURBO C (Pearson Education)
2. V. Rajaraman: Programming in C (PHI – EEE)
3. S. ByronGottfried: Programming with C (TMH)
4. Kernighan & Ritchie: The C Programming Language (PHI)
5. Yashwant Kanitkar: Let us C
6. P.B. Kottur: Programming in C (Sapna Book House)

Course Code: DSC-1Lab	<b>Course Title: C Programming Lab</b>
Course Credits: 02	Hour of Teaching/Week: 04
Total Contact Hours: 52	Formative Assessment Marks: 10
Exam Marks: 40	Exam Duration: 04

### Practice Lab

The following activities be carried out/ discussed in the lab during the initial period of the semester.

1. Basic Computer Proficiency
  - a. Familiarization of Computer Hardware Parts
  - b. Basic Computer Operations and Maintenance.
  - c. Do's and Don'ts, Safety Guidelines in Computer Lab
2. Familiarization of Basic Software – Operating System, Word Processors, Internet Browsers, Integrated Development Environment (IDE) with Examples.
3. Type Program Code, Debug and Compile basic programs covering C Programming fundamentals discussed during theory classes.

### Programming Lab Part

#### Part A:

1. Write a C Program to read radius and find area and volume of a sphere.
2. Write a C Program to read three numbers and find the biggest of three
3. Write a C Program to demonstrate library functions in *math.h* (at least 5)
4. Write a C Program to read a number, find the sum of the digits, reverse the number and check it for palindrome
5. Write a C Program to read numbers from keyboard continuously till the user presses 999 and to find the sum of only positive numbers
6. Write a C Program to read percentage of marks and to display appropriate grade (using switch case)
7. Write a C Program to find the roots of quadratic equation (if else ladder)
8. Write a C program to read marks scored in 3 subjects by n students and find the average of marks and result (Demonstration of single dimensional array)
9. Write a C Program to remove Duplicate Element in a single dimensional Array
10. Program to perform addition and subtraction of Matrices

#### Part B:

1. Write a C Program to find the length of a string without using built in function
2. Write a C Program to demonstrate string functions (at least 3).
3. Write a C Program to demonstrate pointers in C
4. Write a C Program to generate n prime number by defining *isprime ()* function
5. Write a C Program to find the trace of a square matrix using function
6. Write a C Program to read, display and multiply two matrices using functions
7. Write a C Program to read a string and to find the number of alphabets, digits, vowels, consonants, spaces and special characters.
8. Write a C Program to Reverse a String using Pointer
9. Write a C Program to demonstrate student structure to read & display records of n students.
10. Write a C Program to demonstrate the difference between structure & union.

Note: Student has to execute a minimum of 8 programs in each part to complete the Lab course

## Evaluation Scheme for Lab Examination

Assessment Criteria		Marks
Program – 1 from Part A	Flowchart / Algorithm	04
	Writing the Program	05
	Execution and Formatting	06
Program -2 from Part B	Writing the Program	08
	Execution and Formatting	07
Viva Voce based on C Programming		05
Practical Record		05
Total		<b>40</b>

## Semester: II

Course Code: DSC-2	<b>Course Title: Data Structures using C</b>
Course Credits: 04	Hour of Teaching/Week: 04
Total Contact Hours: 52	Formative Assessment Marks: 40
Exam Marks: 60	Exam Duration: 03

### Course Outcomes (COs):

After completing this course satisfactorily, a student will be able to:

- Describe how arrays, records, linked structures, stacks, queues, trees, and graphs are represented in memory and used by algorithms
- Describe common applications for arrays, records, linked structures, stacks, queues, trees, and graphs
- Write programs that use arrays, records, linked structures, stacks, queues, trees, and graphs
- Demonstrate different methods for traversing trees
- Compare alternative implementations of data structures with respect to performance
- Describe the concept of recursion, give examples of its use
- Discuss the computational efficiency of the principal algorithms for sorting and searching

### Course Content

Content	Hours
<b>Unit - 1</b>	
<b>Introduction to data structures:</b> Definition; Types of data structures - Primitive & Non-primitive, Linear and Non-linear; Operations on data structures. Algorithm Specification, Performance Analysis, Performance Measurement <b>Recursion:</b> Definition; Types of recursions; Examples - Fibonacci numbers, GCD, Binomial coefficient ${}^nC_r$ , Towers of Hanoi; Comparison between iterative and recursive functions.	8
<b>Unit - 2</b>	
<b>Arrays:</b> Basic Concepts – Definition, Declaration, Initialization, Operations on arrays; Types of arrays; Arrays as abstract data types (ADT); Representation of Linear Arrays in memory; Traversing linear arrays; Inserting and deleting elements; Sorting – Selection sort, Bubble sort, Quick sort, Insertion sort, merge sort; Searching - Sequential Search, Binary search; Iterative and Recursive searching; Multidimensional arrays; Representation of multidimensional arrays; Sparse matrices.	12

<b>Unit - 3</b>	
<p><b>Stacks:</b> Basic Concepts – Definition and Representation of stacks; Operations on stacks; Applications of stacks; Infix, postfix and prefix notations; Conversion from infix to postfix using stack; Evaluation of postfix expression using stack; Application of stack in function calls.</p> <p><b>Queues:</b> Basic Concepts – Definition and Representation of queues; Types of queues – Simple queues, Circular queues, Double ended queues, Priority queues; Operations on Simple queues;</p>	10
<b>Unit - 4</b>	
<p><b>Dynamic memory allocation:</b> Static &amp; Dynamic memory allocation; Memory allocation and de-allocation functions - malloc, calloc, realloc and free.</p> <p><b>Linked list:</b> Basic Concepts – Definition and Representation of linked list, Types of linked lists - Singly linked list, Doubly linked list, Header linked list, Circular linked list; Representation of Linked list in Memory;</p> <p>Operations on Singly linked lists – Traversing, Searching, Insertion, Deletion; Memory allocation; Garbage collection</p>	12
<b>Unit - 5</b>	
<p><b>Trees:</b> Definition; Tree terminologies –node, root node, parent node, ancestors of a node, siblings, terminal &amp; non-terminal nodes, degree of a node, level, edge, path, depth;</p> <p><b>Binary tree:</b> Type of binary trees - strict binary tree, complete binary tree, binary search tree and heap tree; Array representation of binary tree. Traversal of binary tree; preorder, inorder and postorder traversal; Reconstruction of a binary tree when any two of the traversals are given.</p>	10

#### **Text Books**

1. Sartaj Sahani: Fundamentals of Data Structures

#### **References**

1. Tanenbaum: Data structures using C (Pearson Education)
2. Kamathane: Introduction to Data structures (Pearson Education)
3. Y. Kanitkar: Data Structures Using C (BPB)
4. Sudipa Mukherjee: Data Structures using C – 1000 Problems and Solutions (McGraw Hill Education, 2007)

Course Code: DSC-2Lab	<b>Course Title: Data Structures Lab</b>
Course Credits: 02	Hour of Teaching/Week: 04
Total Contact Hours: 52	Formative Assessment Marks: 10
Exam Marks: 40	Exam Duration: 04

## Programming Lab

### Part A:

1. Write a C Program to find GCD using recursive function
2. Write a C Program to display Pascal Triangle using binomial function
3. Write a C Program to generate n Fibonacci numbers using recursive function.
4. Write a C Program to implement Towers of Hanoi.
5. Write a C Program to implement dynamic array, find smallest and largest element of the array.
6. Write a C Program to read the names of cities and arrange them alphabetically using bubble sort.
7. Write a C Program to sort the given list using selection sort technique.
8. Write a C Program to sort the given list using insertion sort technique.

### Part B:

1. Write a C Program to sort the given list using quick sort technique.
2. Write a C Program to sort the given list using merge sort technique.
3. Write a C Program to search an element using linear search technique and recursive binary search technique.
4. Write a C Program to implement Stack.
5. Write a C Program to convert an infix expression to postfix.
6. Write a C Program to implement simple queue.
7. Write a C Program to implement linear linked list.
8. Write a C Program to implement traversal of a binary tree.

## Evaluation Scheme for Lab Examination

Assessment Criteria		Marks
Program – 1 from Part A	Algorithm	02
	Writing the Program	05
	Execution and Formatting	05
Program -2 from Part B	Algorithm	04
	Writing the Program	06
	Execution and Formatting	08
Viva Voce based on Data Structures		05
Practical Record		05
Total		<b>40</b>

## Syllabus for Open Electives in Computer Science:

Course Code: CSOE-1	<b>Course Title: Computer Fundamentals</b>
Course Credits: 03	Hour of Teaching/Week: 03
Total Contact Hours: 42	Formative Assessment Marks: 40
Exam Marks: 60	Exam Duration: 03

### Course Outcomes (COs):

After completing this course satisfactorily, a student will be able to:

- Introduction to computers, classification of computers, anatomy of computer, constituents and architecture, microcontrollers
- Operating systems, functions of operating systems, classification of operating systems, kernel, shell, basics of Unix, shell programming, booting
- Databases, why databases are used, users, SQL, data types in SQL, introduction of queries - select, alter, update, delete, truncate, using where, and or in not in
- Internet basics, features, applications, services, internet service providers, domain name system, browsing, email, searching
- Web Programming basics, introduction of HTML and CSS programming
- Introduction of computers, classification of computers, anatomy of computer, constituents and architecture, microcontrollers.

### Course Content

Content	Hours
<b>Unit - 1</b>	
<b>Fundamentals of Computers:</b> Introduction to Computers - Computer Definition, Evolution and History of Computers, Basic Organisation of a Digital Computer; Number Systems – different types, conversion from one number system to another; Computer Codes – BCD, Gray Code, ASCII and Unicode; Boolean Algebra – Boolean Operators with Truth Tables; Types of Software – System Software and Utility Software; Computer Languages - Machine Level, Assembly Level & High Level Languages, Translator Programs – Assembler, Interpreter and Compiler; Planning a Computer Program - Algorithm, Flowchart and Pseudo code with Examples(at least 5 hours of teaching .	10
<b>Unit-2</b>	

<p><b>Introduction to Computer:</b> Characteristics of computers, Classification of Digital Computer Systems: Microcomputers, Minicomputers, Mainframes, Super computers.</p> <p>Anatomy of Computer: Introduction, Functions &amp; Components of a Computer, Central Processing Unit, Storage units, Input and output Devices. How CPU and memory works. Program execution with illustrative examples. Introduction to microcontrollers.</p>	10
<b>Unit-3</b>	
<p><b>Operating System Fundamentals:</b> Operating Systems: Introduction, Functions of an operating System, Classification of Operating Systems, System programs, Application programs, Utilities, The Unix Operating System, Basic Unix commands, Microkernel Based Operating System, Booting.</p>	08
<b>Unit-4</b>	
<p><b>Introduction to Database Management Systems:</b> Database, DBMS, Why Database -File system vs DBMS, Database applications, Database users, Introduction to SQL, Data types, Classification of SQL-DDL with constraints, DML, DCL, TCL</p>	08
<b>Unit-5</b>	
<p><b>Internet Basics:</b> Introduction, Features of Internet, Internet application, Services of Internet, Logical and physical addresses, Internet Service Providers, Domain Name System.</p> <p><b>Web Basics:</b> Introduction to web, web browsers, http/https, URL, HTML5, CSS</p>	06

**Text Books:**

1. Pradeep K. Sinha and Priti Sinha: Computer Fundamentals (Sixth Edition), BPB Publication
2. David Riley and Kenny Hunt, Computational thinking for modern solver, Chapman & Hall/CRC,

**Reference:**

1. J. Glenn Brook shear, "Computer Science: An Overview", Addison-Wesley, Twelfth Edition,
2. R.G. Dromey, "How to solve it by Computer", PHI,



Course Code: CSOE02	<b>Course Title: Problem Solving and C Programming Concepts</b>
Course Credits: 03	Hours/Week: 03
Total Contact Hours: 42	Formative Assessment Marks: 40
Exam Marks: 60	Exam Duration: 03 Hours

### Course Outcomes (COs):

After completing this course satisfactorily, a student will be able to:

1. Introduction to computers, classification of computers, anatomy of computer, constituents and architecture, microcontrollers
2. Operating systems, functions of operating systems, classification of operating systems, kernel, shell, basics of Unix, shell programming, booting
3. Databases, why databases are used, users, SQL, data types in SQL, introduction of queries - select, alter, update, delete, truncate, using where, and or in not in
4. Internet basics, features, applications, services, internet service providers, domain name system, browsing, email, searching
5. Web Programming basics, introduction of HTML and CSS programming
6. Introduction of computers, classification of computers, anatomy of computer, constituents and architecture, microcontrollers.

### Course Content

Content	Hours
<b>Unit – 1</b>	
<b>Problem Solving Techniques:</b> Problem solving techniques – problem definition, analysis, design, debugging, testing, documentation and maintenance. Design Tools - ALGORITHM: definition, characteristics, advantages and disadvantages. FLOWCHART - definition, symbols, advantages and disadvantages. Writing an algorithm and flowchart: Area of circle, arithmetical operations, simple interest and compound interest, quadratic equation, largest of three numbers, sum of N natural numbers, factorial of number, Fibonacci series, prime number, reverse a given number, evaluation of series like $\sin(x)$ , $\cos(x)$ , $e^x$ , $\log(x)$ etc.	10
<b>Unit-2</b>	

<p><b>Introduction to C Programming:</b> Overview of C; History and Features of C; Structure of a C Program with Examples; Creating and Executing a C Program; Compilation process in C.</p> <p><b>C Programming Basic Concepts:</b> C Character Set; C tokens - keywords, identifiers, constants, and variables; Data types; Declaration &amp; initialization of variables; Symbolic constants, Formatted I/O functions - printf and scanf,</p>	10
<b>Unit-3</b>	
<p><b>C Operators &amp; Expressions:</b> Arithmetic operators; Relational operators; Logical operators; Assignment operators; Increment &amp; Decrement operators; Bitwise operators; Conditional operator; Special operators; Operator Precedence and Associativity; Evaluation of arithmetic expressions; Type conversion.</p>	08
<b>Unit-4</b>	
<p><b>Decision making, branching and looping:</b> Decision making - if and if-else statement, nested if, else if ladder, switch statements, conditional operator, goto statement. Looping - while, do-while and for, nested for. break and continue statements. Programs on these concepts.</p>	08
<b>Unit-5</b>	
<p><b>Arrays:</b> One Dimensional arrays - Declaration, Initialization and Memory representation; Two Dimensional arrays - Declaration, Initialization and Memory representation.</p>	06

**References :**

1. Computer Concepts and Programming, Padma Reddy
2. Let us C , Yashwanth Kanetkar
3. Ansi C, Balagurusamy
4. Problem solving with C, M. T. Somashekara and D. S. Guru

Course Code: CAO E03	<b>Course Title: Office Automation</b>
Course Credits: 03	Hours/Week: 03
Total Contact Hours: 42	Formative Assessment Marks: 40
Exam Marks: 60	Exam Duration: 03 Hours

### Course Content

Content	Hours
<b>Unit - 1</b>	
<b>Windows Desk top</b> - GUI: Definition, Standards, Cursors/Pointers, Icons, GUI Menus, GUI-Share Data - Desktop icons and their functions: My computer, My documents, Network neighbourhood, Recycle Bin, Quick launch tool bar, System tray, Start menu, Task bar - Dialog Boxes: List Box, Spin Control Box, Slide, Drop-down list, Radio button, Check box, Text box, Task Bar - System Tray - Quick launch tool bar - Start button - Parts of Windows -Title bar-Menu bar - Scroll bar- Status bar, Maximize, Minimize, close and Resize & Moving a Window - Windows - Start Menu -Help Menu- Preview Menu; Logoff & Shutdown - Keyboard Accelerators: Key board short keys or hotkeys	06
<b>Unit-2</b>	
<b>MS Word</b> - Working with Documents -Opening & Saving files, Editing text documents, Inserting, Deleting, Cut, Copy, Paste, Undo, Redo, Find, Search, Replace, Formatting page & setting Margins, Converting files to different formats, Importing & Exporting documents, Sending files to others, Using Tool bars, Ruler, Using Icons, using help, Formatting Documents - Setting Font styles, Font selection- style, size, colour etc, Type face - Bold, Italic, Underline, Case settings, Highlighting, Special symbols, Setting Paragraph style, Alignments, Indents, Line Space, Margins, Bullets & Numbering. Setting Page style - Formatting Page, Page tab, Margins, Layout settings, Paper tray, Border & Shading, Columns, Header & footer, Setting Footnotes & end notes - Shortcut Keys; Inserting manual page break, Column break and line break, creating sections & frames, Anchoring & Wrapping, Setting Document styles, Table of Contents, Index, Page Numbering, date & Time, Author etc., Creating Master Documents, Web page. Creating Tables- Table settings, Borders, Alignments, Insertion, deletion, Merging, Splitting, Sorting, and Formula, Drawing - Inserting ClipArt, Pictures/Files etc., Tools - Word Completion, Spell	10

Checks, Mail merge, Templates, Printing Documents – Shortcut keys.	
<b>Unit-3</b>	
<b>MS Excel:</b> Spread Sheet & its Applications, Opening Spreadsheet, Menus - main menu, Formula Editing, Formatting, Toolbars, Using Icons, Using help, Shortcuts, Spreadsheet types. Working with Spreadsheets- opening, saving files, setting Margins, Converting files to different formats (importing, exporting, sending files to others), Spread sheet addressing - Rows, Columns & Cells, Referring Cells & Selecting Cells – Shortcut Keys. Entering & Deleting Data- Entering data, Cut, Copy, Paste, Undo, Redo, Filling Continuous rows, columns, Highlighting values, Find, Search & replace, Inserting Data, Insert Cells, Column, rows & sheets, Symbols, Data from external files, Frames, Clipart, Pictures, Files etc, Inserting Functions, Manual breaks, Setting Formula - finding total in a column or row, Mathematical operations (Addition, Subtraction, Multiplication, Division, Exponentiation), Using other Formulae. Formatting Spreadsheets, Formatting layout for Graphics, Clipart etc., Worksheet Row & Column Headers, Sheet Name, Row height & Column width, Visibility - Row, Column, Sheet, Security, Sheet Formatting & style, Sheet background, Colour etc, Borders & Shading – Shortcut keys. Working with sheets – Sorting, Filtering, Validation, Consolidation, and Subtotal. Creating Charts - Drawing. Printing. Using Tools	10
<b>Unit-4</b>	
<b>MS Power point:</b> Introduction to presentation – Opening new presentation, Different presentation templates, Setting backgrounds, Selecting presentation layouts. Creating a presentation - Setting Presentation style, Adding text to the Presentation. Formatting a Presentation - Adding style, Colour, gradient fills, Arranging objects, Adding Header & Footer, Slide Background, Slide layout. Adding Graphics to the Presentation- Inserting pictures, movies, tables etc into presentation, Drawing Pictures using Draw. Adding Effects to the Presentation- Setting Animation & transition effect. Printing Handouts, Generating Standalone Presentation viewer.	10
<b>Unit-5</b>	

**Internet and Web Browsers:** Definition of WebAddressing-URL-Different types of Internet Connections; Dial up connection, Broad band ( ISDN, DSL, Cable), Wireless ( Wi-Fi, WiMax, Satellite, Mobile) naming convention, browsers and its types, internet browsing, searching - Search Engines - Portals - Social Networking sites- Blogs - viewing a webpage, downloading and uploading the website; Creating an email-ID, e-mail reading, saving, printing, forwarding and deleting the mails, checking the mails, viewing and running file attachments, addressing with cc and bcc.

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**References:**

1. Fundamentals of computers - V.Rajaraman - Prentice- Hall of india
2. Microsoft Office 2007 Bible - John Walkenbach,Herb Tyson,Faithe Wempen,cary N.Prague,Michael R.groh,Peter G.Aitken, and Lisa a.Bucki -Wiley India pvt.ltd.
3. Computer Fundamentals - P. K. Sinha Publisher: BPB Publications.
4. Computer & Internet Basics Step-by-Step - Etc-end the Clutter - Infinity Publishing.
5. <https://en.wikipedia.org>
6. <http://windows.microsoft.com/en-in/windows/windows-basics-all-topics>