FACULTY OF ENGINEERING & TECHNOLOGY

SYLLABUS FOR THE

SUBJECT: COMPUTER SCIENCE

for the award of the Degree in

BACHELOR OF ARTS/ BACHELOR OF SCIENCE/ HONOURS

(Offered under 4-year UG Degree Programme)

(Credit Based Grading System) under NEP 2020

Batch: 2024-28

(SEMESTER I-II)

(SEMESTER : III-VIII WILL BE UPLOADED LATER ON)



GURU NANAK DEV UNIVERSITY AMRITSAR

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SCHEME

	Semester - I				
S. No.	Course	Course Title	Credits		
	Code		L-T-P		
1		Computer Fundamentals & PC Software (Theory)	3-0-0		
2	Lab-1: Computer Fundamentals & PC Software (Practical)		0-0-1		
		Total Semester credits	04		
		Semester – II			
1		Introduction to Programming in C (Theory)	3-0-0		
2		Lab-1: Introduction to Programming in C (Practical)	0-0-1		
		Total Semester credits	04		
1 2		Semester-III Computer Oriented Numerical And Statistical Methods (Theory) Lab-1: Computer Oriented Numerical And Statistical Methods using C (Practical)	3-0-0 0-0-1		
		Total Semester credits	04		
		Semester-IV			
1		Data Structures & File Processing using C++ (Theory)	3-0-0		
2		Lab-1: Data Structures & File Processing using C++ (Practical)	0-0-1		
		Total Semester credits	04		
		Semester-V			
1.		Web Designing & Development (Theory)	3-0-0		
2.		Lab-1: Web Designing & Development (Practical)	0-0-1		
3.		Internship with local public/private industry/ business /organization	0-0-2		
		Field Practice – 1			
		Total Semester credits	06		
		Semester-VI			
1.		Data Base Management Systems (Theory)	3-0-0		
2.		Lab-1: Data Base Management Systems (Practical)	0-0-1		
		Total Semester credits	04		

2

Semester-VII					
1.	Computer Networks (Theory)		4-0-0		
2.	Information Systems (Theory))		4-0-0		
3.	Operating System (Theory)		4-0-0		
4.	Programming in Java (Theory))		3-0-0		
5.	Lab-1: Programming in Java (Practical)		0-0-1		
6.	Data Analytics with python	(Theory Minor-1)	3-0-0		
7.	Lab-2: Data Analytics with python	(Practical Minor-1)	0-0-1		
8.	Internship with local public/private indust	try/ business /organization	0-0-2		
	Field Practice – 2				
		Total Semester credits	22		
	Semester-VIII	Total Semester credits	22		
1.	Semester-VIII Cloud computing (Theory)	Total Semester credits	22 4-0-0		
1. 2.	Semester-VIII Cloud computing (Theory) Artificial Intelligence (Theory)	Total Semester credits	22 4-0-0 4-0-0		
1. 2. 3.	Semester-VIII Cloud computing (Theory) Artificial Intelligence (Theory) Software Engineering (Theory)	Total Semester credits	22 4-0-0 4-0-0 4-0-0		
1. 2. 3. 4.	Semester-VIII Cloud computing (Theory) Artificial Intelligence (Theory) Software Engineering (Theory) Machine Learning (Theory)	Total Semester credits	22 4-0-0 4-0-0 3-0-0		
1. 2. 3. 4. 5.	Semester-VIIICloud computing (Theory)Artificial Intelligence (Theory)Software Engineering (Theory)Machine Learning (Theory)Lab-1: Machine Learning (Practical)	Total Semester credits	22 4-0-0 4-0-0 3-0-0 0-0-1		
1. 2. 3. 4. 5. 6.	Semester-VIIICloud computing (Theory)Artificial Intelligence (Theory)Software Engineering (Theory)Machine Learning (Theory)Lab-1: Machine Learning (Practical)Data Visualization	Total Semester credits (Theory Minor-2)	22 4-0-0 4-0-0 3-0-0 0-0-1 3-0-0		
1. 2. 3. 4. 5. 6. 7.	Semester-VIIICloud computing (Theory)Artificial Intelligence (Theory)Software Engineering (Theory)Machine Learning (Theory)Lab-1: Machine Learning (Practical)Data VisualizationLab-2: Data Visualization	Total Semester credits (Theory Minor-2) (Practical Minor-2)	22 4-0-0 4-0-0 3-0-0 0-0-1 3-0-0 0-0-1		

* Note : Students Opting for Computer Science subject in Bachelor of Arts /Bachelor of Science /Honours may choose any one of the following Skill Enhancement Course (SEC) in his/her degree Programme during Ist, IInd and IIIrd Year.

SEC-1 : Introduction to the Internet (Theory & Practical)

SEC-2 : Cyber security fundamentals (Theory & Practical)

SEC-3 : Python for Data Analysis (Theory & Practical)

SEMESTER–I Computer Science Computer Fundamentals & PC Software

(Theory)

M. Marks: 75 Time : 3 Hours Credits L-T-P 3-0-0 (45 Hrs)

Instructions for the Paper Setters: -

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Course outcomes:

- learn the functioning of various components of a computer system.
- identify input and output devices and storage devices.
- getting familiar with software.
- create documents, spreadsheets, and presentations

SECTION-A (12 Hrs.)

Introduction to Computer, Generations of Computers, Classification of Computers, Computer Applications:

Computer as a system, basic concepts – hardware and software, functional units, and their interrelation. Block diagram showing Central Processing Unit, Memory, and Input/Output Devices. Communication devices.

SECTION–B (11 Hrs.)

Software: System software and Application software. Programming languages.

Hardware: Input Devices- Keyboard, mouse, pens, touch screens, Bar Code reader, joystick, source data automation, (MICR, OMR, OCR), screen assisted data entry: portable/handheld terminals for data collection, voice recognition systems

Output Devices: Display Monitors, Printers, Impact Printers, Non-impact Printers, Plotters, Voice Output Systems, Projectors, Terminals.

Storage Devices: Concept of storage units (bit, byte, KB, MB etc.), Primary storage, Secondary storage, Magnetic storage devices, and Optical Storage Devices.

SECTION-C (11 Hrs.)

Operating System: meaning, purpose, Windows GUI, Command-line, Powershell overview. File Explorer.

Microsoft (MS) Office: download and install; different components

Word Processing using Microsoft (MS) Word: Overview, creating, saving, opening, importing, exporting and inserting files, formatting pages, paragraphs and sections, indents and outdents, creating lists and numbering. headings, styles, fonts and font size; editing, positioning, and viewing texts; finding and replacing text; inserting page breaks, page numbers, bookmarks, symbols, and dates; using tables, header, footer, macros, mail-merge; printing setup

SECTION-D (11 Hrs.)

Presentations using MS Powerpoint : Presentation overview, entering information, presentation creation, opening and saving presentation; inserting audio and video, shapes, different views, formatting; playing slides. Spreadsheets using MS Excel: Spreadsheet overview, Editing, Formatting, freeze panes, using formulas and functions, sorting and filtering, pivot tables, charts and Graphs.

Recommended Books:

- 1. P.K. Sinha, Computer Fundamentals : concepts, systems and applications, BPB Publications
- 2. E Balagurusamy, FUNDAMENTALS OF COMPUTERS Tata McGraw Hill Education Private Limited NEW DELHI
- 3. Peter Norton, Introduction to Computers, McGraw Hill Education
- 4. MS–Office _ BPB Publications.
- 5. Gurvinder Singh & Rachpal Singh, Windows-Based Computer Courses.
- 6. E-books at OpenOffice.org
- 7. A Conceptual Guide to OpenOffice.org3, 2nd Edition, R. Gabriel Gurley

Semester-I Computer Science Lab 1 : Computer Fundamentals & PC Software (Practical)

M. Marks: 25 Time: 3 Hours Credits L-T-P 0-0-1 (30 Hrs)

Instructions for the Examiners: -

Two questions of equal marks strictly as per the syllabus and based on the practical exercises covered in the semester. Questions may be subdivided into parts (not exceeding four). Candidates will attempt ONE question, explain their answer by writing on the answer sheet, and then implement the same on the computer. Examiner will evaluate both the answers (theory as well as practical). The viva should also be conducted alongside, and the student is asked viva questions related to the question and the solution he/she is working on during the exam.

Students will prepare a report after analyzing print and social media advertisements along with the local market survey to understand the desktop/laptop vendors and prices. Arrange the options available as per price/performance preferences

Lab exercises based on:

- Practice the Windows Operating System command line and the GUI for user interaction, personalization, and file management
- Document preparation with Word using the features mentioned in the syllabus
- Spreadsheet processing with Excel using the features mentioned in the syllabus
- Presentation preparation with PowerPoint using the features mentioned in the syllabus

Semester-II

Computer Science Introduction to Programming in C (Theory)

M. Marks: 75 Time: 3 Hours Credits L-T-P 3-0-0 (45 Hrs)

Instructions for the Paper Setters: -

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Course Outcomes:

- Understand and use Program development lifecycle and can employ various tools for it.
- Develop the program logic to solve simple and complex problems.
- Use various programming constructs of C like branching, looping and arrays.
- Deploy the pointers for memory management.

SECTION-A (12 Hrs.)

Introduction : Introduction to computer Programming, concept of algorithm, flowchart, Program structure, Program Development life Cycle-Compiling and executing Programs using IDE, command line

Fundamentals : Token, Character set, Identifiers and Key Words, Constants, Variables, Expressions, Statements, Symbolic Constants; Data types, declaring variables, initializing variables, types of integers, types of floats, strings, characters

C Preprocessor directives : #define Statement, Conditional Compilation, include Files typedef, enum, Type Casting

Operations and Expressions : Arithmetic operators, Unary operators, Relational Operators, Logical Operators, Assignment and Conditional Operators

Data Input and Output statements, Library functions

SECTION-B (11 Hrs.)

Control Statements: Preliminaries, While, Do-while and For statements, Nested loops, If-else, Switch, Break-Continue statements.

Program Structure Storage Class : Automatic, external and static variable, multiple file programs.

Arrays : Defining, processing an array, passing arrays to a function, multi-dimensional arrays. **Strings :** String declaration, string functions and string manipulation.

SECTION-C (11 Hrs.)

Functions: Brief overview, defining, accessing functions, passing arguments to function, variable scope, specifying argument data types, function prototypes, recursion.

Pointers : Fundamentals, pointer declaration, passing pointer to a function, pointer and one-dimensional arrays, operation on pointers, pointers & multi-dimensional arrays of pointers, passing functions, dynamic memory management.

SECTION-D (11 Hrs.)

Structures & Unions : Defining and processing a structure, user defined data types, structures and pointers, passing structures to functions, self-referenced structure, unions, Arrays and Structures.

File handling in C : Introduction, file input/output function, binary file and text files.

Recommended Books and Materials:

- 1. R.S. Salariya, Applications Programming in C, Khanna Book Publishing Co. (P) Ltd., Delhi.
- 2. Byron Gotterfied, Programming in C, Tata McGraw Hill Publishing Company Ltd., Delhi.
- 3. Yashvant Kanetkar, Let Us C, BPB Publications, Delhi.
- 4. Dennis Ritchie, Brian Kernighan, C Programming Language, Prentice Hall India.

SEMESTER-II Computer Science

Lab-1 : Introduction to Programming in C

(Practical)

M. Marks: 25 Time: 3 Hours Credits L-T-P 0-0-1 (30 Hrs)

Instructions for the Examiners: -

Two questions of equal marks strictly as per the syllabus and based on the practical exercises covered in the semester. Questions may be subdivided into parts (not exceeding four). Candidates will attempt ONE question, explain their answer by writing on the answer sheet, and then implement the same on the computer. Examiner will evaluate both the answers (theory as well as practical). The viva will also be conducted one-on-one alongside, and the student asked viva questions related to the question and the solution he/she is working on during the exam.

Lab Exercises based on Implementation of C:

- 1. Compiling and executing programs using IDE
- 2. C Preprocessor directives
- 3. Operations & Expressions
- 4. Data Input and Output statements
- 5. Control Statements
- 6. Program Structure Storage Class
- 7. Arrays & Strings
- 8. Functions & Pointers
- 9. Structure & Unions
- 10. File handling in C