

SEMESTER-I
COMPUTER SCIENCE
COMPUTER FUNDAMENTALS & PC SOFTWARE
(THEORY)

M. Marks: 75
Time: 3 Hours

Credits
L-T-P
3-0-0

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. Ebooks at OpenOffice.org
7. A Conceptual Guide to OpenOffice.org3, 2nd Edition, R. Gabriel Gurley

Bachelor of Arts /Bachelor of Science/Honours (Computer Science) (CBGS)
(under NEP 2020) (Batch 2025-29) (Semester-III)
(Faculty of Engineering & Technology)

SEMESTER-III
COMPUTER SCIENCE
COMPUTER ORIENTED NUMERICAL & STATISTICAL METHODS
(THEORY)

M. Marks: 75
Time: 3 Hours

Credits
L-T-P
3-0-0

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 numerical and statistical analysis of data.
- identify different iterative solution of Non-linear Equations.
- getting familiar with trend analysis.
- Using tools for data analysis

SECTION-A

Introduction:

Numerical methods, Numerical methods versus numerical analysis, Errors and Measures of Errors.

Non-linear Equations, Iterative Solutions, Multiple roots and other difficulties, Interpolation methods, Methods of bisection, False position Method, Newton Raphson-method.

SECTION-B

Simultaneous Solution of Equations, Gauss Elimination Method Gauss Jordan method. Gauss Siedel Method, Matrix Inversion Method.

SECTION-C

Interpolation and Curve Fitting, Lagrangian Polynomials, Newtons Methods: Forward Difference Method, Backward Difference Method Divided Difference Method.

Numerical Integration and Different Tryaperzoidal Rule, Simpson's 1/3 Rule Simpson's 3/8 Rule.

SECTION-D

Numerical differentiation by Polynomial Fit Statistical Techniques

Measure of Central Tendency, Preparing frequency distribution table, Mean Arithmetic, Mean geometric, Mean harmonic, Mean median Mode.

Measure of dispersion, Skewness and Kurtosis Range, Mean deviation, Standard deviation, co-efficient of variation, Moments Skewness Kurtosis.

Correlation Bivariate Distribution Multivariate distribution.

Regression B.C., Linear Regression, Multiple Regression.

Trend Analysis least square fit linear trend, Non-linear trend

$$Y=AXB$$

$$Y=ABX$$

$$Y=ACX$$

$$\text{Polynomial fit: } Y=a+a_1X+a_2X^2+a_nX^n+n$$

Recommended Books:

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

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SEMESTER-III

COMPUTER SCIENCE

**COMPUTER ORIENTED NUMERICAL & STATISTICAL METHODS
(PRACTICAL)**

M. Marks: 25
Time: 3 Hours

Credits
L-T-P
0 -0 -1

Lab 2h/week

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 :

Numerical method exercises in C :

1. Iterative Solutions
2. Simultaneous Solution of Equations
3. Interpolation and Curve Fitting

Statistical analysis using a spread sheet tool such as MS Excel :

4. Measures of Central Tendency, Measures of dispersion
5. Correlation
6. Regression
7. Trend Analysis

SEMESTER-V
COMPUTER SCIENCE
WEB DESIGNING & DEVELOPMENT
(THEORY)

M. Marks: 75
Time: 3 Hours

Credits
L-T-P
3-0-0

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 web technologies and the web development process.
- getting familiar with HTML Basics, CSS
- create websites using BootStrap and JavaScript
- Awareness of Responsive Design and Web performance optimization

SECTION-A

Introduction to Web Design and Development: Overview of web technologies and the web development process, Understanding the difference between web design and development, Introduction to HTML, CSS, and JavaScript

HTML Basics: Structure of an HTML document, Common HTML elements (headings, paragraphs, lists, links, images, Tables, Linking, Frames, Forms), Semantic HTML and its importance, Introduction to DOM.

SECTION-B

CSS Fundamentals: Introduction to CSS and its role in web design, CSS selectors, properties, and values, Box model, layout techniques (flexbox, grid)

Responsive Design: Principles of responsive web design, Media queries and breakpoints, Using frameworks like Bootstrap for responsive layouts

SECTION-C

JavaScript Basics: Introduction to JavaScript and its role in web development, Basic Programming Techniques & Constructs: Variables, data types, functions, and control structures, Operators, Functions, GET/POST Methods, DOM Manipulation & Event handling

SECTION-D

Forms Validation, Cookies, Inter-page communication and form data handling using JavaScript
Web Performance Optimization: Techniques for optimizing website performance, Using tools to analyze website performance, Importance and usage of SEO (Search Engine Optimization).

Recommended books:

1. Jon Duckett, HTML and CSS: Design and Build Websites
2. Jon Duckett, JavaScript and J Query: Interactive Front-End Web Development"
3. Jennifer Niederst Robbins, Learning Web Design: A Beginner's Guide to HTML, CSS, JavaScript, and Web Graphics
4. Ben Frain, Responsive Web Design with HTML5 and CSS
5. Ethan Brown, Web Development with Node and Express
6. Terry Felke-Morris, Web Development and Design Foundations with HTML5, McGraw Hill
7. Jon Duckett, Beginning HTML, XHTML, CSS, and JavaScript, Cengage
8. Luke Welling and Laura Thomson, PHP and MySQL Web Development, Pearson Education

SEMESTER-V
COMPUTER SCIENCE
WEB DESIGNING & DEVELOPMENT
(PRACTICAL)

M. Marks: 25
Time: 3 Hours

Credits
L-T-P
0-0-1

Lab (2h/week)

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.

Programming exercises based on:

- Exploring Web Technologies and Setting up the Development Environment (e.g. Visual Studio Code)
- Creating HTML Documents using headings, paragraphs, lists, links, and images
- Advanced HTML Elements (create forms), applying CSS styles, understanding Box model, Layout techniques
- Integrate Bootstrap into the project and use its grid system to create a responsive layout
- Basic JavaScript programming: GET/POST methods, DOM Manipulation, Event handling, Form validation, working with cookies
- Analyze the performance of the developed webpage using tools like Google Page Speed Insights and Understanding basic SEO

SEMESTER-V
COMPUTER SCIENCE

INTERNSHIP WITH LOCAL PUBLIC/PRIVATE INDUSTRY/ BUSINESS/ ORGANIZATION
FIELD PRACTICE-1

M. Marks: 50
Time: 3 Hours

Credits
L-T-P
0-0-2

Field Practice (4h) /week

Course Outcomes:

- To put theory into practice
- To expand thinking and broaden the knowledge and skills acquired through course work in the field.
- To relate to, interact with, and learn from current professionals in the field.
- To understand and adhere to professional standards in the field
- To gain insight to professional communication
- To identify personal strengths and weaknesses
- To develop the initiative and motivation to be a self-starter and work independently

Internship/Professional practice: Internship/Professional practice can provide students the opportunity to enhance skills which include knowledge of office automation, problem-solving skills, database creation, debugging, cybersecurity, programming languages, frameworks etc. Students under the guidance of internal guide/s and external guide shall take part in all the activities regularly to implement as much knowledge as possible. The students shall take part in discussions to foster friendly and stimulating environment in which they are motivated to reach high standards and become self-confident.

Assessment : Each student, is required to

- Submit a report.
- Present the seminar on the internship orally through power point slides.
- Answer the queries.

Instructions for the Assessment:

- Candidates will undergo training and prepare an internship report. As End-Semester Examination, evaluation of the student will be based on the quality of report submitted, presentation skills and their response in the Q/A session by the examiners. The internship report carries 30 marks, seminar of 10 marks, and Q/A 10 marks.