PROGRAMME NAME/S      : COMMON TO ALL ENGINEERING PROGRAMS

SEMESTER               : FIRST
COURSE TITLE         : COMPUTER FUNDAMENTALS
COURSE CODE         :

## I. RATIONALE

This course provides a foundational understanding of computers, covering basic hardware, software, number systems, operating systems, networks, and office productivity tools. It empowers students with essential computer literacy to be competent users of modern computing systems and applications relevant across various domains.

## II. INDUSTRY/EMPLOYER EXPECTED OUTCOME

- Understand and explain the core hardware and software components of a computer system.

- Convert and calculate values across various number systems and perform binary arithmetic.

- Operate Windows and command-line interfaces (CLI), and understand different types of operating systems.

- Demonstrate basic understanding of networking concepts, internet usage, and e-governance tools.

- Create and manage documents, spreadsheets, and presentations using modern office software.

## III. COURSE LEVEL LEARNING OUTCOMES (COs)

**CO1:** Understand and describe basic components, functions, and types of computer systems.
**CO2:** Perform number system conversions and binary arithmetic.
**CO3:** Understand basic concepts and classifications of operating systems and use command-line tools.
**CO4:** Understand network fundamentals, internet tools, and information technologies in daily life.
**CO5:** Apply office productivity tools for word processing, data handling, and presentations.

## IV. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

| Sr. No. | Theory Learning Outcomes (TLOs) aligned to COs | Learning Content Mapped with Theory Learning Outcomes (TLOs) and COs | Suggested Learning Pedagogies | No. of Lecture | Relevant COs |
|---|---|---|---|---|---|
| 1 | TLO 1.1 Describe the components and classification of computers | Unit I – Computer Introduction: Data vs. information, block diagram, components, types (analog/digital), generations, I/O devices, memory hierarchy, CPU, system vs application software | Lecture, Demo, Hands-On | 6 | CO1 |
| 2 | TLO 2.1 Perform conversions between number systems and do arithmetic operations | Unit II – Number System: Binary, BCD, Gray, Octal, Hexadecimal, conversions, floating point numbers, binary arithmetic | Lecture, Problem-solving, Practice | 6 | CO2 |
| 3 | TLO 3.1 Describe OS classifications and perform basic CLI tasks | Unit III – Operating System: Definition, responsibilities, types, GUI vs CUI, MS-DOS commands (file/directory operations) | Lecture, Demo, Practice | 4 | CO3 |
| 4 | TLO 4.1 Describe network devices, topologies, and Internet tools | Unit IV – Networks & Internet: LAN, MAN, WAN, switches, routers, tools, topologies, internet protocols, browsers, email, search engines | Lecture, Demonstration | 4 | CO4 |
| 5 | TLO 5.1 Use word processing, spreadsheet, and presentation tools | Unit V – Office Application: Word (editing, formatting), Excel (formulas, charts), PowerPoint (slides, animations) | Lecture, Hands-On | 8 | CO5 |
| 6 | TLO 6.1 Understand role and applications of IT in modern society | Unit VI – Role of IT: Cyber laws, e-commerce, GIS, e-Governance, IT services, codes (QR, MICR, etc.) | Lecture, Discussion | 4 | CO4 |

## V. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL EXPERIENCES

| Practical LLO | Sr. No | Laboratory Experiment Title | No. of | Relevant COs |
|---|---|---|---|---|

| | | | Hrs | |
|---|---|---|---|---|
| LLO1: Use and navigate Windows OS environment | 1 | Explore desktop, taskbar, control panel | 4 | CO1 |
| LLO2: Use basic hardware and peripheral devices | 2 | Install and configure printers, manage fonts, clipboard usage | 4 | CO1 |
| LLO3: Create and format documents in Word | 3 | Paragraph formatting, bullets, macros, tables | 6 | CO5 |
| LLO4: Implement mail merge | 4 | Mail merging letters and envelopes | 4 | CO5 |
| LLO5: Perform spreadsheet operations | 5 | Formatting, functions, charts in Excel | 8 | CO5 |
| LLO6: Create presentations | 6 | PPT Slide design, animation, transitions | 6 | CO5 |
| LLO7: Use the Internet and email | 7 | Searching, using email tools | 4 | CO4 |
| LLO8: Use MS DOS CLI commands | 8 | File and directory operations via CLI | 6 | CO3 |
| LLO9: Create digital business cards | 9 | Design using shapes, text, and color | 6 | CO5 |

## VI. SUGGESTED ASSIGNMENTS / SELF-LEARNING ACTIVITIES

| Title | Description | Skills Developed |
|---|---|---|
| File Handling Practice | Create and organize folders/files using CLI and GUI | Basic system usage |
| Number System Drill | Solve binary and hexadecimal problems | Logical reasoning |
| IT in Daily Life | Report on IT tools in banking, governance, etc. | Research, awareness |
| Presentation Design | Create themed PowerPoint with transitions | Design thinking |
| Cyber Law Awareness | Write a note on IT Act & data protection | Legal literacy |

## VII. SUGGESTED EQUIPMENT / TOOLS / SOFTWARE REQUIRED

| Sr. No | Equipment Name | Relevant LLO |
|---|---|---|
| 1 | Desktop PCs with latest Windows OS | All |
| 2 | MS Office or LibreOffice Suite | All |

| 3 | Printer and peripherals | LLO2 |
|---|---|---|
| 4 | Internet connection with browser | LLO7 |
| 5 | DOS emulator or Windows CMD | LLO8 |

## VIII. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE

| Sr. No | Unit | Unit Title | Aligned Cos | Learning Hours | Weightage (%) |
|---|---|---|---|---|---|
| 1 | I | Computer Introduction | CO1 | 6 | 15 |
| 2 | II | Number System | CO2 | 6 | 15 |
| 3 | III | Operating System | CO3 | 4 | 10 |
| 4 | IV | Networks & Internet | CO4 | 4 | 15 |
| 5 | V | Office Application | CO5 | 8 | 25 |
| 6 | VI | Role of IT | CO4 | 4 | 20 |
| Total | | | | 32 | 100 |

## IX. CO-PO MATRIX FORM

| COs | PO1 | PO2 | PO3 | PO4 |
|---|---|---|---|---|
| CO1 | 3 | 2 | 1 | 2 |
| CO2 | 3 | 3 | 2 | 2 |
| CO3 | 3 | 2 | 2 | 3 |
| CO4 | 3 | 2 | 2 | 3 |
| CO5 | 3 | 2 | 3 | 3 |
| Legend: High = 3, Medium = 2, Low = 1, No Mapping = - | | | | |

## X. SUGGESTED LEARNING MATERIALS / BOOKS

| Sr. No | Author | Title | Publisher / ISBN |
|---|---|---|---|
| 1 | P.K. Sinha | Computer Fundamentals | BPB Publications, New Delhi |
| 2 | Anita Goel | Computer Fundamentals | Pearson Education, New Delhi |
| 3 | V. Rajaraman | Fundamentals of Computer | PHI Publication |
| 4 | D.J. Rosencrantz | Fundamental Problems in Computing | Springer |
| 5 | Ron Faile et al. | LibreOffice - The Documentation Foundation | TDF |

| 6 | Arti Rathore | Microsoft Office 2010 Course (Hindi) | BPB Publication |
| 7 | R.K. Tyagi | English Communication Skills | Nav Distributor, Meerut |

## XI. LEARNING WEBSITES & PORTALS

| Sr. No | Link | Description |
|---|---|---|
| 1 | https://www.libreoffice.org | LibreOffice tutorials and documentation |
| 2 | https://www.microsoft.com | Microsoft Office official resources |
| 3 | https://www.geeksforgeeks.org | Tutorials on number systems and basics |
| 4 | https://www.tutorialspoint.com | Office tools and internet fundamentals |