Course Type: - Minor   **Semester**: - 1st
Paper Title: - **ELEMENTS OF COMPUTER SCIENCE**   **Paper Code**: - ACPC1123N
Credit Weightage: - THEORY -04; PRACTICALS- 02   **Batch**: - 2023

Course Objective: To provide an overview of the subjects of computer science.

Course Outcomes:

- Know the working principles of functional units of a basic Computer
- Understand program development and the use of algorithms in problem solving.
- Know the need and types of operating system & database systems.
- Understand the significance of networks, internet, WWW and cyber security.
- Understand Autonomous systems and the applications of artificial intelligence.

UNIT – I

BASICS OF A COMPUTER – Hardware, Software, Generations of computers. Hardware - functional units, Components of CPU, Memory – hierarchy, types of memory, Input and output devices. Software – Systems software, application software, packages, frameworks, IDEs.

UNIT – II

OFFICE PRODUCTIVITY TOOLS -word processing, spreadsheets and Presentation Graphics Software. Software development – Software development life cycle (SDLC), Types of computer languages – Programming, steps in program development, flowcharts and algorithms.

UNIT – III

OPERATING SYSTEMS: Functions of operating systems, types of operating systems, Device & Resource Management.
DATABASE MANAGEMENT SYSTEMS: Data, information, databases and database management systems, data centres and Cloud services.
COMPUTER NETWORKS: Advantages of computer networks, LAN, WAN, MAN, internet, Wi-Fi, sensor networks, vehicular networks, 5G communication.

UNIT – IV

WORLD WIDE WEB : Concept of a HTML, web page & Website. Web Browsers, Web servers, Search Engines; Understanding URL; Domain name; IP Address; Using e-governance website, social media, Online Social networks.
SECURITY – information security, cyber security, cyber laws.
AUTONOMOUS SYSTEMS: IOT, Robotics, Block chain, Drones, Artificial Intelligence – Learning, Game Development, natural language processing, image and video processing. Cloud Basics.

TEXT & REFERENCES:
1. Invitation to Computer Science, -G. Michael Schneider | Judith L. Gersting, Cengage Learning.
2. Fundamentals of Computers, Reema Thareja, Oxford Higher Education, Oxford University Press.
3. Introduction to computers, Peter Norton, 8th Edition, Tata McGraw Hill.
4. Computer Fundamentals, P K Sinha 8th Edition, BPB Publishers.
5. Computer Fundamentals, Anita Goel, Pearson Education India, 2010.
6. Fundamentals of Computers,V Rajaraman 6th edition PHI Learning Private Limited.
7. Comdex Information Technology course tool kit Vikas Gupta, *WILEY Dreamtech.*
8. PC Hardware - A Handbook – Kate J. Chase *PHI* (Microsoft).

LAB WORK -ELEMENTS OF COMPUTER SCIENCE (ACPC1123N)

Task-1. Disassemble and assemble the PC back to working condition (A video be provided as part of the course content).

Task-2. Installation of MS windows & Linux as dual boot on a PC.

Task-3. Linux command line interface (CLI) and its essential commands.

Task-4. Access Internet via LAN and configuration of various TCP/IP settings.

Task-5. Customize a web browser with the LAN proxy settings, bookmarks, search toolbars and pop up blockers.

Task-6. Use of Search engines and Netiquette.

Task-7. Computer/ Web Browser Customization for Enhanced Internet Safety (Blocking of pop ups/active x downloads to avoid viruses).

Task-8. USING MS WORD: Formatting Fonts in word, Drop Cap, Applying Text effects, Using Character Spacing, Borders and Colours, Inserting Header and Footer, Using Date and Time option. Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Task-9. Creating a Newsletter in MS Word: Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge.

Task-10. USING MS EXCEL (Features to be covered) – Accessing, overview of toolbars, saving excel files, Using help and resources. Gridlines, Format Cells, Summation, auto fill, Formatting Text. Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, hyper linking, Count function, LOOKUP/VLOOKUP. Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting.

Task-11. USING MS POWERPOINT (Features to be covered): PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in PowerPoint. Interactive presentations -Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts. Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc.), and Inserting – Background, textures, Design Templates, Hidden slides.

Task-12. Utilizing Collaboration/Teamwork Tools for Enhanced Productivity (Features to be covered): Familiarization with collaboration and teamwork tools such as Google Drive, Microsoft OneDrive, and DropBox. Exploration of various features offered by these tools, including document collaboration, version control, file sharing and permissions, real-time communication, and offline access and syncing.

Task-13. Exploration of basic IoT Devices and Sensors.