

CAP1007:FUNDAMENTALS OF INFORMATION TECHNOLOGY

L:3 T:0 P:2 Credits:4

Course Outcomes: Through this course students should be able to

CO1 :: describe the fundamental concepts of computers, peripheral devices, memory units, and number systems

CO2 :: explain the concepts of operating systems, computer networks, and data communication, and apply networking concepts to basic computing scenarios

CO3 :: demonstrate the use of storage devices, operating system utilities, and networking concepts in basic computing applications

CO4 :: analyze emerging IT technologies such as Cloud Computing, IoT, Artificial Intelligence, and Data Science, and evaluate their real-world applications.

CO5 :: apply Google Workspace tools and advanced spreadsheet techniques to create, manage, analyze, and share digital information.

Unit I

Fundamentals of Computer : characteristics & generation of computers, block diagram of a computer, application of computers in various sectors, data representation using number system, conversion in number systems

Unit II

Computer Storage, Processing and I/O Devices : types of memory, memory units, secondary storage devices: HDD, flash drives and, optical disks: DVD, SSD, I/O devices such as keyboard, mouse, LCDs, scanner, plotter, printer;; latest I/O devices in market

Unit III

Data Communication and Networks : local and global search of network, digital and analog transmission, components of data communication system, modes of communication (simple, half duplex, duplex), network topologies, wireless networks, an overview of internet and its working, Internet Protocol (IP), IPv4 and IPv6 addressing, the role of IP in addressing and routing, network types and their features.

Unit IV

An Introduction to Operating Systems : Basics of operating systems, purpose of operating systems, providing a user interface, types of operating systems, enhancing an OS with utility software

Unit V

Advanced IT Technologies : introduction to cloud computing, cloud service models, concept of virtualization and virtual servers, cloud and database storage, basics of IoT & its applications, IoT framework, role of sensors and actuators in IoT framework

Unit VI

Artificial Intelligence : definition and scope of AI, history and evolution of AI, introduction to machine learning, neural networks, natural language processing, generative AI

Data science : definition and importance, big data, Data collection methods, primary vs. secondary data, basics of data cleaning and transformation, introduction to data analytics

List of Practicals / Experiments:

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- Google Drive: creating files, accessing files, uploading files, and sharing files.
- Google Docs: create a Google document, share a Google document, how to collaborate using Google Docs, provide feedback with comments and suggested edits in a document, add links to comments, using Explore within a Google Sheets document
- Google Sheet: create a Google Sheet, formatting cells, using formula and functions including sum, avg, count, if, unique, sorting numbers, text or date. Analyse the data in google sheet with charts and graphs, share sheet with others
- Google Forms: create a Google Form, add/edit different question types in Google Form, choose a response destination, edit from settings, email Google Form to users, view responses, using google forms for feedback

- Advanced Google Sheets: Data Validation (Drop-down Lists), Conditional Formatting, Remove Duplicates, Split Text to Columns
- Advanced Formula & Functions: VLOOKUP, HLOOKUP, XLOOKUP, IFERROR, COUNTIFS, SUMIFS
- Data Analysis: Pivot Tables, Pivot Charts, Slicers, Dynamic Charts, Dashboard creation
- Projects: Student Result Management System, Employee Payroll Management System, Sales Dashboard, Attendance & Feedback Management System

Text Books:

1. COMPUTER FUNDAMENTALS by PRADEEP K SINHA & PRITI SINHA, BPB PUBLICATIONS
2. GOOGLE WORKSPACE GUIDE FOR BEGINNERS: MASTER GMAIL, DRIVE, DOCS, SHEETS, MEET, AND EVERY TOOL IN GOOGLE WORKSPACE by WILLIAMS OLIVER, PAPERBACK

References:

1. FUNDAMENTALS OF COMPUTERS by RAJARAMAN, V. ADABALA, NEEHARIKA, PHI Learning
2. OPERATING SYSTEM CONCEPTS by ABRAHAM SILBERSCHATZ, PETER B. GALVIN, GREG GAGNE, WILEY