Course Code	Course Name	Load Distribution (LT P C)
DTCS-401	Computer Architecture and Maintenance	4 0 0 4

Learning Outcome:

1. Understand various components of motherboard and their organization and various Processor types.

2. Understand various kind of storage devices in the computer and their interfacing.

3. Comprehend the interfacing and organization and working of Display devices like CRT and LCD.

4. Comprehend the working and construction of various input and output devices.

5. Understanding various power related devices and issues in computer and handling different power failures

Unit 1. **10 hours**

Motherboard And Its Components:

Chipset fundamentals covering role, functions, North Bridge–South Bridge concept and Hub architecture; processor bus basics with PCI and PCI Express comparison; logical memory organization (conventional, extended and upper memory); cache memory purpose with internal/external cache and L1, L2, L3 levels; overview of primary memory technologies SDRAM, DDR, DDR2 and DDR3; basic features of Pentium III, Pentium 4, Pentium D and processors from AMD

Unit 2. **9 hours**

Storage Devices and Its Interfacing:

Recording techniques (FM, MFM, RLL and perpendicular recording), hard disk construction and working, servo techniques (wedge, embedded and dedicated), essential hard disk terms (track, sector, cylinder, cluster, landing zone and MBR), basic concepts of formatting and partitioning, introduction to file systems (FAT16, FAT32 and NTFS).

Unit 3. **9 hours**

Display Devices & Interfacing:

Concepts of display devices including colour CRT and LCD monitors with their working principles, key characteristics and simple comparison; introductory idea of video accelerator card; fundamentals of multiplexing techniques (TDM, FDM and WDM) and spread spectrum methods (FHSS and DSSS); and basic concepts of switching techniques such as circuit switching and packet switching.

Unit 4:

Input & Output Devices: **10 hours**

Basic construction and working of input and output devices including keyboard (common key switch types), mouse (mechanical and optical), scanner (flatbed and sheet-fed with basic specifications), modem (internal and external with basic function), and printers (dot matrix, inkjet and laser)

Unit 5: **8 hours**

Power Supplies:

Working of SMPS with block diagram, introduction to AT and ATX power connectors, essential power supply characteristics, common power problems and basic protection devices, UPS fundamentals with working and types, and introductory overview of computer interfaces including USB, RS-232, Centronics and FireWire

Text Books:

1. Mike Meyers, Scott Jernigan, Managing & Troubleshooting PCs, Tata McGraw Hill.
2. Mark Minasi, The Complete PC Upgrade & Maintenance Guide, Tata McGraw Hill.
3. D. Balasubramanian, Computer Installation & Servicing, Tata McGraw Hill.

Reference Books:

1. Stephen J. Bigelow, Bigelow's PC Hardware Desk Reference, Second edition, McGraw-Hill Osborne Media.

Course Code	Course Name	Load Distribution (LT P C)
DTCS-402	Python Programming	3 0 0 3

Learning Outcomes:

1. Understand the features of Python as a language and using python shell to run programs.
2. Understand and implement data structures and looping constructs in python.
3. Implementation and comprehension of use of functions in python with functional paradigm.
4. Design of Classes and Objects in python with use of inheritance and polymorphism.
5. Understanding and implementation of famous and useful python libraries for various purposes

Unit 1: **8 hours**

Introduction to Python

The Python Philosophy, Programming Paradigms in Python(Imperative, Procedural, Functional and Object-Oriented), Fundamentals of the Python Language, Applications of Python, Overview of Python 3, Installation and Configuration of Python, Basic Data Types in Python, Variables and Dynamic Typing, Operators in Python, Basic Input and Output Operations.

Unit 2: **8 hours**

Language Features of Python

Identifiers and Keywords in Python, Python Statements and Indentation Rules, Type Conversion and Type Casting, String Fundamentals, String Creation, Indexing and Slicing, String Immutability, String Operators, Built-in String Functions and Methods, String Formatting.

Unit 3: **9 hours**

Control Structures and Functions in Python:

Branching Statements – if, else and elif, Looping Statements – while and for, Use of break and continue Statements, Functions in Python, Function Definition and Function Call, Function Parameters and Arguments, Return Statement, Scope of Variables, Lambda Function.

Unit 4: **8 hours**

Data Structures in Python:

Built-in Data Collections in Python – Lists, Tuples, Dictionaries and Sets, Creation and Initialization, Accessing and Updating Elements, Common Operations (Insertion, Deletion and Searching), Traversal of Collections, Built-in Functions and Methods for Lists, Tuples, Dictionaries and Sets.

Unit 5: **9 hours**

Standard Library Modules in Python:

Introduction to Python Standard Library, Standard Library Modules – random module (random number generation), time module (time functions and delays), datetime module (date and time handling), math (mathematical functions and constants), Usage of Standard Library Modules.

Text Books:

1. Core Python Programming Paperback – 2018 ,R.Nageshwara Rao, Dreamtech Press.

Reference Books:

1. Learn Python 3 The Hard Way Textbook Binding – 2017 , by Zed A.Shaw.
2. Python : The Complete Beginners Guide - Step By Step Instructions (The Black Book),Kindle edition

Course Code	Course Name	Load Distribution (LT P C)
DTCS-403	Computer Networks	3 0 0 3

Learning Outcomes:

1. Understand the basic network concepts and network architectures.
2. Understand the implementation of various network topologies and several network devices.
3. Understand several types of transmission media and different communication techniques.
4. Understand both of the OSI and TCP/IP network reference models.
5. Understanding the implementation IP Addressing and protocols.

Unit 1: **8 hours**

Basic Network Concepts:

Understanding Network – History of Networks, Computer Networks, Identifying the Benefits of Network - Sharing Information, Sharing Resources, Facilitating Centralized Management, Maintaining the Network. Computer networks classification based on geographical area, size, and purpose- PAN, LAN, WLAN, CAN, MAN, WAN, SAN, VPN.

Network Types based on Architecture- Peer-to-Peer, Client-Server Network, Hybrid Network, Intranet, Extranet, Internet.

Unit 2: **9 hours**

Transmission Media: Guided Media -Twisted Pair -UTP, STP; Coaxial Cable; Optical Fiber - Optical Fiber Structure, Light Source for Fiber, Propagation Mode, Advantages of optical fiber, Disadvantages of optical fiber. Unguided Media: Radiowaves, Microwaves, Infrared. Infrastructureless Communication.

Unit 3: **8 hours**

Network Topologies and Networking Devices:

Type of Topologies - Bus Topology, Ring Topology, Star Topology, Mesh Topology, Tree Topology, Hybrid Topology. Network Connecting Devices: Active Hubs, Passive Hubs, Repeaters, Two-Layer Switches, Three- Layer Switches, Bridges, Routers, Gateways, Modems.

Unit 4: **8 hours**

Network Reference Model:

OSI Reference Model - Interlayer Communication– Horizontal Communication, Vertical Communication, Layered Architecture, Peer-to-Peer Processes, Encapsulation Terminology; Physical layer; Data link layer; Network layer; Transport layer; Session layer; Presentation layer; Application layer.

TCP/IP Model – Link; Internet; Transport; Application layer. Comparison of the OSI and TCP/IP reference models.

Unit 5: **10 hours**

Network Protocols and IP Addressing:

Introduction to Basic Network Protocols like HTTP, HTTPS, DNS, DHCP, SMTP, TCP and UDP, Types of Addresses- Physical Address, Port Address, Introduction to IPv4 Addressing, IP Address Classes, Subnet Masking, Private and Public IP Addressing, Static and Dynamic IP Addressing, Special IP Addresses, Introduction to IPv6 Address. Types of Switching Techniques- Circuit and Packet Switching.

Text Books:

1. Introduction to Networking, Richard A. McMohan, Sir, Tata McGraw-Hill Edition.
2. Computer Networking: "A Top Down Approach (5th edition)", Ross and Kurose, Pearson/Addison-Wesley.
3. A.S.Tanenbaum, Computer networks, third edition, PHI.

Reference Books:

1. Complete Reference Networking, Craig Zacker, Tata McGraw-Hill Edition.

Course Code	Course Name	Load Distribution (LT P C)
DTCS-404	Data Structures	3 0 0 3

Learning Outcomes:

1. Understand different types of data types and various algorithm analysis terminology.
2. Comprehend and implement certain sorting techniques.
3. Comprehend and design certain kinds of linear and static kind of data structures.
4. Understand and design dynamic data structures and tree based data structures.
5. Understand and design graph based data structures and hashing techniques.

Unit 1: **8 hours**

Introduction to data structure:

Introduction to Data Structures, Data Representation in Computer Memory, Data Types and Data Structures, Primitive and Non-Primitive Data Types, Linear and Non-Linear Data Types, Basic Operations on Data Structures, Applications of Data Structures.

Unit 2: **9 hours**

Searching & Sorting using Arrays:

Introduction to Arrays, Representation of Arrays in Memory (Indexing and Address Calculation), One-Dimensional Arrays, Operations on Arrays (Traversal, Insertion, Deletion and Updating), Linear Search, Binary Search, Bubble Sort.

Unit 3: **9 hours**

Stacks & Queue:

Introduction to Stacks, Representation of Stacks through Arrays, Basic Operations on Stack (Push, Pop, Peek), Application of Stacks. Introduction to Queue, Representation of Queues, Operations on queue, Application of Queues.

Unit 4:

Linked List: **10 hours**

Introduction, Terminology of Linked Lists (Node, Data, Pointer, Next, NULL Pointer, Empty List etc.). Operations on Singly Linked List (Searching, Insertion and Deletion). **Trees:** Introduction to Trees, Basic Definition of Binary Trees, Types of Binary Trees, Binary Search Tree (BST), Operations on Binary Search Tree (Searching, Insertion and Deletion), Tree Traversal Techniques – Pre-order, In-order and Post-order.

Unit 5: **9 hours**

Graphs:

Introduction to Graphs, Terminology of Graphs, Graph Components (Vertices and Edges), Directed and Undirected Graphs, Degree of a Vertex, In-Degree and Out-Degree, Adjacency of Vertices, Weighted Graphs, Paths and Path Length. Introduction to Hashing and Hash Functions.

Text Books:

1. Tremblie and Sorrenson, Data Structures, TMH Publications.
2. Lafore, Teach Yourself data Structure and Algorithms in 24 Hrs, BPB Publication.

Reference Books:

1. A. Aho, J.Hopcroft, J.Ulman, Data Structures and Algorithms, Pearson Education, 1998.

Course Code	Course Name	Load Distribution (LT P C)
DTCS-405	Management Information System	3 0 0 3

Learning Outcome:

1. Understand the basics of information system and organizational structures and business planning.
2. Understand the role played by Information systems in Manufacturing and Service sector.
3. Understanding the implementation of decision systems and mining techniques to enable the decision techniques.
4. Comprehend the design and functionality of ERP and CRM systems.
5. Understand the potential threats to information systems and various ethical issues to be avoided

Unit 1: 8 hours

Foundation of Information System:

Information Systems (Concept, Resources and Products, Activities),Management Information System (Definition, Role, Features) Importance of Management, Process of Management (Planning, Organizing, Staffing, Coordinating, Directing).Organizational Structure – Basic model of organization structure,Organizational Behavior, Management Information System Organization Strategic Management of Business – Concept of corporate planning,Essentiality of Strategic planning, Development of Business Strategy, Types of strategies, Tools of planning, MIS Business planning.

Unit 2: 8 hours

Application of MIS:

Applications in manufacturing sector (Personal Management, Financial Management, Production Management, Materials Management, and Marketing Management), Applications in Service sector (Airlines, Hotels, Hospitals, Banking, Insurance, Utilities, and Finance.)

Unit 3: 8 hours

Decision Systems and Mining:

Decision Support System, Characteristics of decision making process, Decision Support System (Concept, Components, Development, Risk). Management Information System and Decision Support System, Concept of Artificial Intelligence & Expert System. Data warehouse (Concept, Design, Organization and Management, Architecture, Implementation), Data in data warehouse, Data Mining.

Unit 4:

Integration of Information: 9 hours

Enterprise Resource Planning (ERP)-ERP (Basic features, Benefits,selection, implementation) Enterprise Management System (EMS) & Management Information System (MIS), Customer Relationship Management (CRM) (Concept , Three Phases of CRM, Benefits , Challenges & Trends), Business Process Outsourcing (BPO) -BPO, Voice BPO i.e. Call Center, Non-Voice BPO, Challenges in BPO Management.Electronic Commerce Systems (E-Commerce) – Concept, Scope, B2C, B2B, C2C, E-Commerce Applications.

Unit 5:

Security & Ethical challenges: 9 hours

Viewing Versus Security, Risks, Threats & Vulnerability, Assessing Risks. Common Controls (Physical, Electronic, Software, Management Controls). Common Threats (Natural Disasters Employee Errors, Computer Crime,Fraud, Abuse, Program Bugs). Ethical & Contractual Behaviors, Privacy, Access & Accuracy Issues, Property Issues.

Text Books:

1. Robert Schulthis& Mary Sumner, Management Information System, Tata Mcgraw Hill.
2. O'Brien, Management Information System, Tata Mcgraw Hill.

Reference Books:

1. Jawadekar, Management Information System, Tata Mcgraw Hill.