

SARDAR PATEL UNIVERSITY
Programme – MSC
(Under Choice Based Credit Scheme)
Semester – I
Syllabus with effect from: 2017-18

MSC- Information Technology



Introduction to Theoretical Computer Science

Course No: PS01CINT21

(Total Marks: 100)

COURSE CONTENT:

Unit 1: Introduction

- Finite, Infinite and uncountable infinite sets
- Ordered sets
- The rules of sum and product
- Relations and functions
- Relational database model
- Reflexive, symmetric and transitive relations, compatibility and equivalence relations
- Partial ordering relations and lattices
- Basic properties of lattices
- Operations of join and meet in a lattice
- Distributive lattices
- Boolean algebras as lattices Canonical expressions
- Applications to digital circuits and switching circuits

Unit 2: Graphs

- Basics of Graph
- Application of graphs
- Problem solving using graph theory.
- Connected graphs, Sub-graphs, Euler graphs, Complete graph.
- Multigraphs and weighted graphs
- Paths and circuits
- Shortest path in a weighted graph
- Eulerian and Hamiltonian paths and circuits Planar graphs

Unit 3: Analysis of algorithms

- Introduction
- Time complexity of algorithms
- The shortest path algorithm
- Complexity of problems
- Tractable and intractable problems.

Unit-4: Time Series and Forecasting

- Introduction
- Utility of Times Series analysis
- Components of Time series
- Cyclic variation and Irregular variation
- Method of measurements of components, Merits and demerits
- Forecasting models and methods.

Reference Books:

1. C Lliu: Elements of Descrete Mathematics – TMH
2. J.E.Hopercroft and J D Ullman: Introductory Theory of Computer Science - Addison Wesley
3. Graph Theory with application to engineering and computer science. Narsingh Deo, PHI.
4. S. C. Gupta – Fundamentals of Statistics, Himalaya Publishing House, Sixth Revised edition
5. Swapan Kumar chakraborty and Bikash Kanti Sarkar: Discrete Mathematics – OXFORD Higher Education

Advanced Programming Concepts & Data Structures

Course No: PS01CMCA22

(Total Marks: 100)

COURSE CONTENT:

Unit 1: Introduction to Object Oriented Concepts

- Introduction to Object Oriented Programming (OOP)
- Advantages of OOP
- Difference between Object Oriented Programming and Procedure Oriented Programming
- An anatomy of C++ Program
- Classes and Objects
- Data members, member functions
- Constructors, Destructors, new and delete operators
- Basic input/output
- Different types of inheritance
- Abstraction
- Encapsulation

Unit 2: Object Oriented Programming

- Access controls
- Input/output in detail
- Polymorphism, virtual functions
- Function overloading
- Operator overloading
- Exception handling
- Introduction to namespace

Unit 3: Introduction to Data Structures

- Time and space efficiency of algorithms
- Primitive and Composite data types
- Arrays
- Stacks
- Queues and its types
- Linked Lists and its types

Unit 4: Randomization & File Management

- Binary Trees and its representations
- Inverted lists, Multi-lists
- Concepts of fields, records and files
- Variable length records
- Hashing techniques for direct files
- Sequential file organization
- Indexed Sequential Access Method (ISAM)
- B trees and B+ trees

Reference Books:

1. Tremblay J. & Sorenson P.G: An Introduction to Data Structures with Applications
2nd Edition – TMH
2. Stroustrup, Bjarne : The C++ Programming Language, Special Edition, Parson
Education Asia, 2001
3. Liberty Jesse & Keogh Jim, C++ - An Introduction to Programming, Prentice Hall
India Ltd., 2001
4. Hubbard J. R., Schaum's Outlines Programming with C++, Tata McGraw-Hill
Publishing Co. Ltd., 2006
5. Object Oriented Programming With C++. Author, E. Balagurusamy

RDBMS & Client Server Computing

COURSE NO: PS01CINT23

COURSE CONTENT:

(Total Marks: 100)

Unit 1: Introduction

- Fundamentals of RDBMS
- Data models
- Operations on RDBMS
- Database design and Normalization, ERD.

Unit 2: Structured query language.

- Introduction to SQL syntax
- Data definition language commands
- Data manipulation language commands
- Data control language commands
- Database objects like views, indexes, sequence, synonyms, and snapshot.

Unit 3: Extension to SQL

- Introduction to PL/SQL: control structures and subprograms
- Stored Procedures and Functions
- Transaction control, concurrency control
- Database triggers, packages and error handling.

Unit 4: Fundamentals of Client Server Systems

- Introduction to distributed system
- Structure of distributed database
- Commit protocols
- Introduction to Client-Server systems
- Two-tier and Three-Tier client-server architecture
- Event-driven programming
- Reverse Engineering

Reference Books:

1. Elmasri R and Navathe S.B: Fundamentals of Database Systems - The Benjamin/Cummings Pub
2. Joe Salemi: Guide to Client/Server Database – ZD Press
3. User Manuals of Selected RDBMS Packages.

Operating System Concepts

COURSE NO: PS01CINT24

(Total Marks: 100)

COURSE CONTENT:

Unit 1: Introduction

- Understanding the role of operating systems
- Interrupt handling
- Operating system interfaces(GUI, Command Line Interface), device drivers, system calls
- Types of Operating Systems
- Structure of operating system
- Operating system services

Unit 2: Process Management

- Process Concept
- Scheduling of Processes, Schedulers: long term, middle term, short term
- Inter Process communications – Shared memory, Message passing
- Introduction to process synchronization
- Critical Section Problem
- Semaphores, Monitors
- Deadlock – detection, prevention and avoidance

Unit 3: Memory Management

- Basic concepts of memory management
- Swapping
- Contiguous Memory Allocation
- Paging
- Segmentation
- Virtual Memory: demand paging, Page Replacement Algorithms

Unit 4: Disk & File System Management

- File Systems
- File attributes, operations, types, access methods
- Directory structure
- Disk structure, disk attachment
- Disk Scheduling
- RAID structures

Reference Books:

1. Silbetschatz, Galvin, Gagne: Operating System Concepts, 8th edition, John Wiley and Sons, Inc., 2008
2. Tanenbaum A. S. : Modern Operating Systems, 3rd edition, Prentice-Hall, 2008

SYSTEMS ANALYSIS AND DESIGN

COURSE NO: PS01CINT25

(Total Marks: 100)

COURSE CONTENT:

1. Introduction

- Concept of system, Basic components of systems
- Information systems categories, Data pyramid
- System analyst – meaning, role
- Users, Need of information system development, Application development portfolio, Integration of portfolio, Controlling and monitoring committees, End users Vs. Institutional development approaches

2. Systems Development Methodologies: SDLC and Structured Approach

- Systems Development Life Cycle (SDLC) method
- Requirement determination, Fact finding techniques
- Tools for documenting procedures and decisions
- Structured Systems Development Strategy
- Data Flow Diagrams (DFDs) for analysis and design
- Physical and logical DFDs, Data dictionary

3. Prototype Development Methodology and Tools

- Systems prototype method
- Use of prototypes and misconceptions
- Strategies for prototype development
- Tools for prototype development
- Prototype for requirement determination and feasibility test
- Project management tools, Front-end tools, Back-end tools
- CASE tools

4. Systems Design, Conversion and Implementation

- Systems design objectives
- Components of design, Software design outputs
- Design of various components such as output, input, processes, security and control, user interface, etc.
- Certification and other quality parameters
- Training users, Objectives for training
- Conversion methods, Documentation,
- Overview of time and effort estimation methods
- Post implementation review

MAIN REFERENCE BOOKS:

1. James A Senn: Analysis and Design of Information System, McGraw Hill International, 2003.

2. Kendall and Kendall: Systems analysis and Design, 5th Edition, Prentice-Hall of India Private Limited, 2003.

BOOKS FOR ADDITIONAL READING:

1. V. Rajaraman : Analysis and Design of Information Systems, Prentice-Hall of India Private Limited, 2003.
2. Jeffrey L. Whitten, Lonnie D. Bentely and Kevin C. Dittman: Systems Analysis and Design Methods, Tata McGraw Hill Publishing Co. Ltd., 2001.
3. Tuthill and Leavy, Knowledge Based Systems : Mangers Perspectives, Tab professional and Reference Books, 1991.

COURSE NO: PS01CINT26

Practical based on PS01CINT22 and PS01CINT23

(Total Marks: 100)

Practical are based on Paper No. PS01CINT22 and Paper No. PS01CINT23