SARDAR PATEL UNIVERSITY

M. Sc. (Information Technology)
(Under Choice Based Credit Scheme)
Semester - I
(Syllabus with effect from June 2020)

COURSE NO: PS01CINT31 ***w.e.f. June 2020***

OBJECT ORIENTED PROGRAMMING USING JAVA

(3 Lectures & 1 Seminar/Tutorial per Week Total Marks: 100)

COURSE CONTENT:

1. Introduction to Java and its Basic Concepts

- The Java programming language: history, evolution, features
- Introduction to the Java programming environment, JDK, JRE
- An anatomy of a Java program
- Data types, wrapper classes, automatic boxing and unboxing
- Encapsulation, Inheritance, polymorphism, Interfaces
- Packages
- Decision making and Loop Control

2. Programming Concepts

- Input-output in Java
- File handling
- Exception handling
- String handling
- Multithreading
- Introduction to java.util package and important members from it

3. Graphical Programming

- Introduction to the Abstract Window Toolkit (AWT)
- Writing graphical programs using Swing library
- Using various Swing components
- Managing layout using Swing
- Event handling using Swing

4. JDBC Concepts

- Introduction to JDBC
- Different types of JDBC drivers
- Programming database applications using JDBC
- GUI Swing Programming database applications using JDBC

REFERENCE BOOKS:

1. Schildt H. : The Complete Reference Java 2, 5th Edition, McGraw-Hill / Osborne, 2002

2. Daniel Joshi and Paul Vorobeiu: The Java 1.1 Programmer – Comdex Times
3. C. Thomas: Introduction to Object Oriented Programming with Java - TMH
4. Naughton: The Java Hand Book - TMH

COURSE NO: PS01CINT32 ***w.e.f. June 2020***

PYTHON PROGRAMMING

(3 Lectures & 1 Seminar/Tutorial per Week Total Marks: 100)

COURSE CONTENT:

1. **Introduction to Python**
   - Brief history, key characteristics, advantages, major application areas
   - Syntax overview, comments, naming conventions
   - Primitive data types, data type constructors
   - Console input and output
   - Control structures
   - Programming exercises
2. **Aggregate and Composite Data Types and Functions**
   - Sequence types: Lists, tuple, range
   - Text sequence type: str
   - Mapping type : dict
   - Set type: set
   - Programming exercises
3. **Some More Features of Python**
   - Exception handling
   - Functions
   - Object-oriented programming in Python – classes, the constructor, members, methods, inheritance
   - Installing, updating and using modules
   - Programming exercises
4. **Developing Applications using Python**
   - File handling
   - Developing GUI applications
   - Database access from Python
   - Programming exercises

REFERENCE BOOKS:

1. Mark Lutz, "Learning Python", 4 th Edition, O'Reilly, 2009

COURSE NO: PS01CINT33 ***w.e.f. June 2020***

COMPUTER NETWORKS & CYBER SECURITY

(3 Lectures & 1 Seminar/Tutorial per Week Total Marks: 100)

COURSE CONTENT:

1. Introduction and Data Communication Fundamentals

- Introduction and classification of computer networks
- Properties of Transmission media
  - Guided Media: Twisted Pair, Co-axial Cable, Fiber Optics
  - Unguided Media: Radio waves, Microwaves, Infrared
- Function of network devices**:** Amplifier, Repeater, Hub, Switch, Bridge, Router, Gateway
- The OSI reference model & TCP/IP reference model
- IEEE 802.3 Ethernet Cabling Scheme

2. High Speed LANs, Satellite Communication & Routing and Congestion Control

- Gigabit Ethernet
- Communication Satellites: Geosynchronous Satellites, Medium-Earth Orbit Satellites, Low-Earth Orbit Satellites, Satellites versus Fiber
- Routing Techniques
  - Static Vs Dynamic Routing Algorithm
  - Shortest Path Routing
  - Flooding
  - Distance Vector Routing
- Congestion Control
  - The concept of congestion
  - Congestion Prevention Policies

3. Internetworking, VPN and Mobile Phone System

- Introduction and Issues that arise in Internetworking
- Different ways in which networks differ
- Fragmentation
- Tunneling & Virtual Private Networks
- The mobile telephone system :
  - Advanced Mobile Phone System
  - D-AMPS: The Digital Advanced Mobile Phone System

4. Cyber Security

- Introduction, Traditional Cryptography, Fundamental Cryptographic
- Principles, Secret-Key Algorithms, Public-Key Algorithms
- Firewalls : Introduction and Packet Filter Firewall
- Cybercrime: Definition and Origins of the World
- Classification of Cybercrimes
- Cybercrime and Indian ITA 2000.
- Introduction to phishing, password cracking, key loggers, spywares, Trojan Horses, DoS/DDoS

REFERENCE BOOKS:

1. Andrew S. Tanenbaum & David J. Wetherall, Computer Networks, Pearson, 5th Edition
2. Nina Godbole , Sunit Belapure, Cyber Security, WILEY

ADDITIONAL REFERENCE BOOKS:

1. Stallings W., Data and Computer Communications, 10th Edition, Pearson.
2. Behrouz Forouzan, Data Communications and Networking, 5th Edition, McGraw-Hill Higher Education
3. William Stallings, Network Security Essentials: Applications and Standards, 6th Edition, Pearson
4. Behrouz A. Forouzan, Cryptography & Network Security, 3rd Edition, McGraw-Hill Higher Education

COURSE NO: PS01CINT34 ***w.e.f. June 2020***

RELATIONAL DATABASE MANAGEMENT SYSTEMS

(3 Lectures & 1 Seminar/Tutorial per Week Total Marks: 100)

COURSE CONTENT:

1. **Introduction to Database Systems and Data Models**
   - Database systems: needs, definitions, advantages
   - Users associated with database systems and their roles
   - Categories of data models (internal level models, conceptual level models and external level models)
   - System catalog, Data independence, Data sharing, Data integrity, Data protection (security, backup and recovery)
2. **Normalization & E-R Diagram**
   - Codd rules
   - Normalization (1 NF to 3 NF)
   - Entity-Relationship Diagram: Entities, Attributes (simple v/s composite, single-valued v/s multi-valued, complex, stored v/s derived), entity keys, relationships, their degree, cardinality ratios for binary relationships (1:1, 1:N, N:1, M:N), attributes of relationships, strong v/s weak entities, recursive relationships and role names, notations
3. **SQL (Structured Query Language)**
   - Introduction to SQL ,
   - Data Types
   - DDL, DML and DCL Commands with syntax
   - Database objects like views, indexes, sequence, & synonyms
   - Built-in functions – mathematical functions, string functions, date & time functions, formatting functions,data type conversion functions
   - Types of Joins
   - Subquery
4. **PL/SQL(Procedural Language for SQL)**
   - Introduction to PL/SQL
   - Control structures
   - Cursor
   - Exception Handling
   - Stored Procedures and Functions
   - Database triggers
   - Packages

REFERENCE BOOKS:

1. Elmasri R and Navathe S.B: Fundamentals of Database Systems - The Benjamin/Cummings Pub
2. Abbey, Corey&Abramson,Oracle 9i**:**A Beginner's Guide,Oracle Press, TMH Edition
3. Ivan Bayross, SQL, PL/SQL, BPB Publications

COURSE NO: PS01CINT35 ***w.e.f. June 2020***

OPERATING SYSTEMS

(3 Lectures & 1 Seminar/Tutorial per Week Total Marks: 100)

COURSE CONTENT:

1. Introduction

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

2. Process Management

- Process Concept
- Queuing Diagram Representation of Process Scheduling
- Schedulers: long term, middle term, short term
- CPU Scheduling Algorithms
- Introduction to process synchronization
- Critical Section Problem
- Semaphores, Monitors
- Introduction to the Concept of a Deadlock, Necessary Conditions for Deadlock

3. Memory Management

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

4. Disk & File System Management

- File Systems
- File attributes, operations, types, access methods
- Directory structure
- Disk structure, Disk attachment
- Disk Scheduling Algorithms – FCFS, SSTF, SCAN, C-SCAN, LOOK, C-LOOK
- 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

COURSE NO: PS01CINT36 ***w.e.f. June 2020***

Practicals