SARDAR PATEL UNIVERSITY

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

SARDAR PATEL UNIVERSITY

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

SARDAR PATEL UNIVERSITY

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

SARDAR PATEL UNIVERSITY

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

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

OPERATING SYSTEM CONCEPTS

(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

SARDAR PATEL UNIVERSITY

COURSE NO: PS02CINT31 ***w.e.f. June 2020***

WEB PROGRAMMING

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

COURSE CONTENT:

1. **Introduction to Front-end Development Tools**
   - HTML Forms
   - Introduction to HTML5 and XHTML
   - CSS: Introduction, Applications, types, properties and attributes, class
   - Introduction to JavaScript: Features, Advantages, DOM, Methods to implement JavaScript, Arrays, Functions, Dialogue Boxes
   - Events, Methods and Validations in JavaScript
2. **Server Side Scripting Using PHP - I**
   - Introduction to Open Source
   - Advantages and Capabilities of Open Source
   - Introduction to PHP: Features, Adding PHP to HTML
   - Common PHP script elements – data types, Variables, Constants, operators,
   - Flow Control and looping,
   - strings, arrays, associative arrays, functions
   - Working with Forms – Form validation, Input validation, regular expression functions
3. **Server Side Scripting Using PHP – II**
   - Introduction to MySQL: Features, Merits and Demerits,
   - Data Types
   - MySQL Functions
   - Database Connectivity
   - Error handling
   - Introduction to Sessions and Cookies
4. **Server Side Scripting Using PHP - III**
   - Security – Authentication (user logins), Authorization (Permissions)
   - Object Oriented Programming with PHP: Classes, Objects, Inheritance, Polymorphism
   - File Handling – Introduction, access, uploading, handling
   - Introduction to Content Management Systems

REFERENCE BOOKS:

1. Ivan Baryons: "Web Enabled Commercial Applications Development using HTML, DHTML, Javascript, PHP"
2. Steve Suehring Tim Converse Joyce Park:PHP6 and MySQL Bible - Wiley Publication
3. Internet reference for the relevant topics

COURSE NO: PS02CINT32 ***w.e.f. June 2020***

SOFTWARE ENGINEERING

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

COURSE CONTENT:

1. **Introduction**
   - General Architecture of Systems with basic components
   - Open and Close Systems
   - TPS, MIS, DSS and ES Types of Systems
   - Software – meaning and applications
   - Software Engineering – meaning, goal, challenges and approach
   - Software Process
   - Software Development Process Models – waterfall, prototyping, iterative, time boxing and spiral
   - Introduction to Agile Computing
2. **Software Requirement Analysis and Project Management**
   - Software Development Life Cycle (SDLC)
   - Software Requirements Specification (SRS) – Need, Process, Problem Analysis, Requirement Specifications, structure and components, Functional Specifications using Use Cases
   - Software Project Management : Project Planning, various issues addressed in Project Planning
   - Work Breakdown Structure (WBS)
3. **Software Design**
   - Design – meaning, types
   - Design approaches - function-oriented design (introduction), object-oriented design
   - Design Concepts for Object-oriented design - information hiding, functional independence, refinement, refactoring and design classes
   - Object Modeling using UML – Overview, Diagrams – class, sequence, collaboration, use-case, activity, state chart
4. **Coding and Testing**
   - Coding – meaning, process, programming standards and guidelines, refactoring, verification, metrics
   - Testing – meaning, importance and process
   - Testing fundamentals – error, fault, bug, failure, test oracles, test cases and test criteria
   - Introduction to Black-box (functional) testing and White-box (structural) testing
   - Comparison of Black-box and White-box testing
   - Alpha testing and Beta testing
   - Testing tools

REFERENCE BOOKS:

1. Jalote Pankaj : Integrated Approach to Software Engineering, 3rd Edition, Narosa Publishing House, 2005 (ISBN 978-81-7319-702-4).
2. Roger S. Pressman : Software Engineering, A Practice Approach, 6th Edition, Mc-Graw Hill International Edition, 2005 (ISBN 007-124083-7).
3. Rajib Mall : Fundamentals of Software Engineering, 2nd Edition, Prentice-Hall of India, 2006 (ISBN-81-203-2445-5).
4. James A Senn : Analysis and Design of Information Systems McGraw Hill Intl. Stdt. Edn, 1985

ADDITIONAL REFERENCE BOOKS:

1. Ian Sommerville : Software Engineering, 6th edition, Pearson Education, 2001, (ISBN 81 7808-497-X).
2. Waman S Jawadekar, Software Engineering Principles and Practice, 1st Edition,Tata McGraw Hill, 2004.
3. Sajja, P.S. "Essence of Systems Analysis and Design: A Workbook Approach", Springer International Publishing, Singapore, 2017

COURSE NO: PS02CINT33 ***w.e.f. June 2020***

ARTIFICIAL INTELLIGENCE

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

COURSE CONTENT:

1. **Artificial Intelligence (AI) and Knowledge Based Systems (KBS)**
   - Natural and Artificial Intelligence
   - Testing Intelligence with Turing Test, and Chinese Room Experiment, Application Areas of Artificial Intelligence, Data pyramid
   - Production systems and AI Based Searches like Hill Climbing and Heuristic Search
   - KBS Structure, Components of KBS, Categories of KBS, Knowledge-Based Shell, Advantages, Limitations and Applications of KBS
   - Knowledge Acquisition, Knowledge Update
   - Factual and Procedural Knowledge Representations
   - Knowledge Based Systems Development Model
2. **Fuzzy Logic**
   - Fuzzy Logic and Fuzzy Sets, Membership Functions,
   - Fuzzification and Defuzzification
   - Operations on Fuzzy Sets
   - Fuzzy Functions and Linguistic Variables
   - Fuzzy Relations, Propositions and Connectives
   - Fuzzy Inference
   - Fuzzy Rules, Fuzzy Control System and Fuzzy Rule Based Systems
3. **Connectionist Models**
   - Introduction to ANN, Biological Neuron and Artificial Neuron
   - Hopfield model of ANN, Parallel relaxation
   - Linearly Separable Problems, Single perceptron
   - Non Linearly Separable problems, Fixed increment perceptron learning
   - Multi Layer Perceptron, Applications of ANN and Cases
4. **Genetic Algorithms**
   - Introduction to Genetic Algorithm (GA),
   - Fundamental Concepts of GA :Gene, Population, Fitness Functions, Generations
   - Encoding Strategies, Genetic Operators, Fitness Functions
   - Typical Genetic Algorithm Cycle
   - Function Optimization, Designing Special Operators and Edge Recombination, Travelling Salesman Problem
   - Schema, Genetic programming

REFERENCE BOOKS:

1. Rich and Knight, Artificial Intelligence, Tata McGraw Hill Publishing Co. Ltd., 21st Indian Reprint, 2001
2. Akerkar RA and Sajja P S, Knowledge-Based Systems, Jones & Bartlett Publishers, Sudbury, MA, USA, 2009
3. Vijyalaxmi Pai and Rajasekaran, Neural Network, Fuzzy Logic and Genetic Algorithms, Prentice Hall of India, 2003
4. Web Resources

ADDITIONAL REFERENCE BOOKS:

1. J S R Jang, C T Sun and E Mizutani, Neuro-Fuzzy Soft Computing, Prentice Hall of India Ltd., 1997
2. Peter Jackson, Introduction to Applied Expert systems, Pearson Education Ltd., Second Indian Reprint, 2001
3. David W Rolston: Principles of AI & ES Development, McGraw Hill, 1988.
4. David E.Goldberg, Genetic Algorithms in Search, Optimization & Machine Learning, Pearson Education, 2002

COURSE NO: PS02CINT34 *w.e.f. June 2020*

VISUAL PROGRAMMING

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

COURSE CONTENT:

1. The .NET Technology

- Introduction to .NET Framework
- Architecture of .NET framework – BCL (Base Class Library), CLR (Common Language Runtime), etc.
- .NET Languages – introduction, Types of applications supported by .NET Technology
- Managed code, compilation to intermediate language, Just-In-Time compilation, garbage collection, assemblies and the GAC

2. Language basics

- C#.NET – Introduction and features
- General structure of C#.NET program
- C#.NET – basic data types, variable, constant, type conversion - Boxing and Unboxing
- C#.NET – statements (conditional and looping)
- Console Applications, Windows Applications - Windows Forms and Life Cycle
- User interface controls - Basic Controls, Dialog controls, Menu control

3. Advance features

- OOPS concepts, Class and Object
- Class types and interface
- Working with Strings, Arrays, Lists and Collections
- Exception handling

4. Database Programming and Reports

- Database programming – concepts
- The ADO.NET architecture (connected and disconnected mode)
- ADO.NET Data providers, Dataset, DataAdapter, DataReader
- Data Controls
- Generating reports

REFERENCE BOOKS:

1. Black Book: .NET 4.5 Programming (6-in-1) covers .NET 4.5 Framework, Visual Studio 2012, C# 2012, ASP.NET 4.5, VB 2012, and F# 3.0, Dreamtech Press, 2013.
2. Bill Evjen, Scott Hanselman, Devin Rader: Professional ASP.NET 4 in C# and VB, Wiley India Pvt. Ltd., 2010
3. Matthew MacDonald: Beginning ASP.NET 4.5 in C#, Apress, 2013

ADDITIONAL REFERENCE BOOKS:

1. Black Book: C# 2010 Programming covers .NET 4.0, Dreamtech Press, 2010
2. Joseph Albabari, Ben Albabari: C# 4.0 in a Nutshell, O'Reilly.

3. Web Resources

COURSE NO: PS02EINT31 *w.e.f. June 2020*

ADVANCED JAVA

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

COURSE CONTENT:

1. **Java Servlet and Java Sever Page(JSP)**
   - Introduction to Java Servlet, Life cycle of Servlet
   - Introduction to JSP, Architecture of JSP
   - Developing simple JSP page
   - JSP directives, JSP scripting elements, JSP action elements
   - JSP implicit objects
2. **The Spring Framework**
   - Introduction to the spring framework and architecture
   - Beans (definition, scope, lifecycle)
   - Aspect-Oriented Spring
   - Spring MVC, Security
   - JDBC Framework
3. **Hibernate**
   - Understanding object relational persistence
   - Hibernate mapping
   - Managing entity identity
   - Mapping class inheritance
4. **Enterprise Java Beans (EJB)**
   - Introduction to Java EE architecture
   - EJB Overview
   - Entity Beans, Session Beans, Message Driven Beans

REFERENCE BOOKS:

1. Bayross Ivan, Shah Sharanam, Bayross Cynthia and Shah Vaishali: Java Server Programming, 2nd Edition, Shroff Publishers and Distributors Pvt. Ltd., 2008
2. Craig Walls : Spring in Action, Dreamtech Press, 4th edition
3. Bauer Chritian and King Gavin : Java Persistence with Hibernate, Dreamtech Press, 2010
4. Panda, Rahman and Lane : EJB 3 in Action, Dreamtech Press, 2010
5. Bond, Law, Longshaw, Haywood and Roxburgh : Teach yourself J2EE, 2nd Edition, Pearson Education, 2007
6. Web sources

ADDITIONAL REFERENCE BOOKS:

1. Shah Sharanam and Shah Vaishali : Struts 2 for beginners, 2nd Edition, Shroff Publishers and Distributors Pvt. Ltd., 2009
2. Koegh Jim : The Complete Reference J2EE, Tata McGraw-Hill, 2006

COURSE NO: PS02EINT32 *w.e.f. June 2020*

DATA SCIENCE

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

COURSE CONTENT:

1. **Introduction to Data Science Data Analytics**
   - Data Science Definition
   - Need and features
   - Importance of Data Science in Modern Business
   - Current Trends in Data Science
   - Analytical Techniques
2. **Introduction to Big Data**
   - Types of Digital Data: Unstructured, Semi-structured and Structured
   - Working with Unstructured Data
   - Evolution and Definition of Big Data
   - Characteristics and Need of Big Data
3. **Introduction to Big Data Analytics**
   - Meaning and Characteristics of Big Data Analytics
   - Need of Big Data Analytics
   - Classification of Analytics
   - Importance of Big Data Analytics
4. **Data Analytics using Python and R**
   - Introduction to NumPy, SciPy
   - Introduction to pandas
   - Introduction to Matplotlib
   - Introduction to R
   - Introduction to R Studio
   - Developing data science applications using Python and R

REFERENCE BOOKS:

1. Davy Cielen, Arno D.B. Meysman, Mohamed Ali, Introducing Data Science: Big Data, Machine Learning and More, Using Python Tools
2. Seema Acharya, Subhashini Chellappan, Big Data and Analytics, Wiley
3. VigneshPrajapati, Big Data Analytics with R and Hadoop – Packrt
4. Mark Lutz, "Learning Python", 4th Edition, O'Reilly, 2009
5. Wes McKinney, "Python for Data Analysis", O'Reilly, 2013
6. Robert I. Kabacoff, "R in Action: Data Analysis and Graphics with R", Manning, 2011
7. e-Book

ADDITIONAL REFERENCE BOOKS:

1. Minelli, Chambers, Dhiray, Big Data Big Analytics, Wiley
2. Bart Baesens, Analytics in a Big Data World , Wiley
3. Thomas Erl, Wajid Khattak, and Paul Buhler, Big data Fundamentals: Concepts, Drives, and Techniques, , Pearson India Education Services Pvt. Ltd., 2016
4. Roger D. Peng and Elizabeth Matsui, The Art of Data Science: A Guide for Anyone Who Works with Data, LeanPub, 2016
5. Brian Caffo, Roger D. Peng and Jeffrey Leek, Executive Data Science A Guide to Training and Managing the Best Data Scientists, LeanPub, 2016
6. Alex Holmes Hadoop in Practice – Dreamtech
7. Documentation of relevant software packages
8. Other web references

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COURSE NO: PS03CINT31 ***w.e.f. June 2020***

MOBILE APPLICATION DEVELOPMENT USING ANDROID

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

COURSE CONTENT:

1. **Introduction to Android**
   - Introduction to Android
   - Standard development environment for Android applications
   - Installing Android
   - Creating Hello World and running application on Emulator
   - Android Architectural Overview and Android Development Framework
   - Introduction to Android Studio
   - Structure of Android application
   - Components of Android
2. **Introduction to Activities and User Interface Design**
   - Introduction to activity
   - Activity lifecycle phases
   - Introducing Toast
   - Introduction to Views and layouts and Common UI components
   - Input and Selection components
   - Adapters
   - Menus and Dialogs
   - Working with Intents
   - Types of Resources
3. **Introduction to Content Provider and Sqlite Database**
   - File systems
   - Persistent storage in Android
   - Android databases
   - Storing and retrieving data
   - Content provider Classes
4. **Multimedia and System Services**
   - Notifications
   - Using images, audio, video
   - Accessing the camera using intent
   - Using text messages (SMS)
   - Performing tasks in background
   - Accessing files and data from a server
   - Introduction to geolocation and location aware applications

REFERENCE BOOKS:

1. Wei-Meng Lee: Beginning Android 4 Application Development, Wiley Publishing, Inc, Wrox Programmer to Programmer, 2013.
2. J. F. DiMarzio: Beginning Android Programming with Android Studio, Wiley Publishing, Inc, 2017.
3. Meier Reto : Professional Android 2 Application Development, Wiley Publishing, Inc., 2010.
4. Documentation of relevant software packages.

ADDITIONAL REFERENCE BOOKS:

1. Darwin I. A. : Android Cookbook, O'Reiley Media, Inc., 2012.
2. Mew K. M. : Android 3.0 Application Development Cookbook, Packt Publishing, 2011.
3. Conder Shane, Darcey Lauren : Android Wireless Application Development, 2nd Edition, Addition Wesley, 2011.

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COURSE NO: PS03CINT32 ***w.e.f. June 2020***

WEB APPLICATION DEVELOPMENT TECHNOLOGY

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

COURSE CONTENT:

1 Basics of ASP.NET

- Introduction to ASP.NET, ASP.NET architecture
- Introduction to Website and WebApplication
- ASP.NET Web Application Project – introduction, creation
- The ASP.NET Page structure, ASP.NET Page Directives
- ASP.NET Web form - introduction, creating web forms
- ASP.NET Page – layout, lifecycle
- State Management in ASP.NET : Client-side and Server-side

2 User Interface Design

- ASP.NET standard controls, navigation controls, validation controls
- Adding server controls to a Web Form, adding event procedures to Web Server Controls, Implementing code-behind pages
- Creating Master Pages
- Working with Themes and skins

3 Database Programming and Web Services

- Accessing Data with ADO.NET
- Dataview Controls
- Authentication and Authorization
- Web Application Security
- ASP.NET Configuration

4 MVC Framework

- MVC Framework – introduction and architecture
- Creating sample web application with MVC
- Web Services – overview, creation and calling
- Web Services

REFERENCE BOOKS:

1. Danny Goodman, Machael Morrison , "JavaScript Bible", 3rd edition.
2. Matthew MacDonald, "Beginning ASP.NET 3.5 in C# 2008", 2nd Edition, Apress,
3. Mathew MacDonald & Maria Szpuszta, "Pro ASP.NET 3.5 in C# 2008", Second Edition, Apress, 2007.

ADDITIONAL REFERENCE BOOKS:

1. G. Andrew Duthie, "ASP.NET programming with Microsoft Visual C#.NET Step by Step", version 2003, Prentice-Hall of India.

2. Internet references for the relevant topics.

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COURSE NO: PS03CINT33 ***w.e.f. June 2020***

COMPUTER GRAPHICS AND MULTIMEDIA

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

COURSE CONTENT:

1. Introduction, Output Primitives, 2-D transformation & Clipping

- Introduction of Computer Graphics & Graphics functions
- Algorithms for output primitives (Line, Circle, Character Generation)
- Attributes of output primitives
- Basic transformations: Translation, Rotation (about origin and about pivot point), Scaling (related to a fixed point), Reflection and Shear with examples
- Viewing pipeline
- Windowing & Clipping
- Window to view port transformation, Point, Line, polygon and text clipping algorithms

2. 3D Concepts

- 3D coordinate systems
- 3-D display methods: Parallel projection, perspective projection
- Introduction of 3D Object representations.
- 3D transformations (translation, rotation and scaling)
- 3D viewing: Viewing pipeline
- Visible Surface detection methods: Back face detection methods and the Z- Buffer algorithm
- Introduction and need of Illumination models and surface-rendering methods

3. Image Operations

- Image Representation: Graphics Formats (GIF (Graphics Interchange Format), Microsoft Windows Bitmap (BMP), JPEG File Interchange Format,TIFF (Tag Image File Format), PNG (Portable Network Graphic Format))
- Introduction, applications and components of Image processing system, Human vision system,
- Digitization: Sampling & Quantization
- Image Enhancement: Contrast Intensification (with examples) and smoothing (with examples), Sharpening and noise reduction
- Introduction of: Image restoration and Image compression (Lossy & Loss-less compression),
- Multi-Valued Image processing (Multi-spectral & Multi-modal) with applications

- Introduction of Image analysis (Segmentation, Edge & Line detection, Feature extraction, Image description & Recognition)
- Color models (RGB, CMY, YIQ, YCbCr and HSI) and conversion between different models

4. Virtual Reality using Multimedia

- Introduction to Multimedia with its applications
- Multimedia hardware & software
- Introduction of digital medium and various facets of multimedia: digital audio, multimedia texts, hypermedia, Graphics
- Animation: two-dimensional and three-dimensional animation techniques and digital video and basic concept for color display
- Multimedia project design / development concepts
- Multimedia authoring and multimedia programming,
- characteristics of authoring tools, authoring methodologies

REFERENCE BOOKS:

1. Donald Hearn & M. Pauline Baker: Computer Graphics. PHI, 1995.
2. Foley J. D., Van Dam A.: Fundamentals of Interactive Computer Graphics, Addison-Wesley, 1982.
3. S. Gokul: Multimedia Magic, BPB Publication, 1998.
4. B. Chanda, D. Dutta Majumder: Digital Image Processing and Analysis, PHI, 2000.

ADDITIONAL REFERENCE BOOKS:

1. Newman W., Sproul R. F. : Principles of Interactive Computer Graphics, McGraw-Hill, 1980.
2. F. S. Hill, J. R. : Computer Graphics. MacMillan Publishing Company,1990.
3. Rafael C. Gonzalez & Richard E. Woods: Digital Image Processing, Addision-Wesley Publishing Company, 1993.

COURSE NO: PS03CINT34 ***w.e.f. June 2020***

TRENDS IN ICT

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

COURSE CONTENT:

1. **Internet of Things**
   - Introduction to IoT
   - Applications of IoT
   - IoT Microcontrollers and boards
   - Introduction to using Arduino and Raspberry Pi
   - Different types of sensors used in IoT
   - Controlling other devices
   - Communication using different protocols
   - Security issues in IoT
2. **Cloud Computing**
   - Cloud Computing Methodolgies
     Service Oriented Architecture
     Virtualization
   - The Cloud Architecture and Cloud Deployment Techniques
   - Cloud Services
   - Cloud Applications
   - Issues with Cloud Computing
   - Public, Private and Hybrid Clouds
   - Cloud Ecosystem and Enabling Technologies
     Infrastructure-as-a-Service (IaaS),
     Platform-as-a-Service (PaaS) and
     Software-as-a-Service (SaaS)
3. **e-Commerce**
   - Introduction to e-Commerce and e-Business
   - 5C model of e-Commerce: Commerce, Collaboration, Communication, Connection, Computation
   - Applications of e-Commerce, Advantages and disadvantages, Ecommerce Models: B2B, B2C, C2C, C2B, and Hybrid Models
   - Electronic Payment procedures: Cash on Delivery, e-Cash, Credit Card, Debit Card, e-Wallet, etc.
   - Technical and Economical Challenges
4. **Machine Learning**
   - Supervised Machine Learning, Example of Supervised Learning, Classification Model using Back Propagation

- Introduction to Deep Learning
- Unsupervised Learning Algorithms, Introduction to Clustering Algorithms: K-means, K-mediods and Agglomerative Algorithms, Introduction to Apriori Algorithm
- Hybrid Soft Computing Systems: Neuro-Fuzzy Systems, Neuro-Genetic Systems and Neuro-Fuzzy-Genetic systems

REFERENCE BOOKS:

1. Vijay Madisetti and ArshdeepBahga, "Internet of Things (A Hands-on-Approach)", 1st Edition, VPT, 2014.
2. Kai Hwang, Jack Dongarra Geoffrey Fox": "Distributed and Cloud Computing :",1st Edition, Parallel Morgan Kaufmann Publishers Inc., San Francisco, CA, USA.
3. Lizhe Wang, Rajiv Ranjan, Jinjun Chen, Boualem Beriatallah: "CLOUD COMPUTING Methodology, Systems and Applications, 1st Edition, CRC Press.
4. Marvin Kutz, Introduction to e-Commerce: Combining Business and Information Technology, Bookboon Publishing, 1st Edition, 2016.
5. Saikat Dutt, Subramanian Chandramouli, Amit Kumar Das, "Machine Learning", Pearson Education.

ADDITIONAL REFERENCE BOOKS:

1. Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1st Edition, Apress Publications, 2013.
2. Barrie Sosinky, "Cloud Computing Bible", John Wiley & Sons.
3. Bernard Golden : "Amazon Web Services for Dummies", 1st Edition, John Wiley & Sons.
4. CunoPfister, Getting Started with the Internet of Things, O"Reilly Media, 2011, ISBN: 978-1-44939357-1.
5. Akerkar RA and Sajja P S, Knowledge-Based Systems, Jones & Bartlett Publishers, Sudbury, MA, USA, 2009.

COURSE NO: PS03EINT31 *w.e.f. June 2020*

SOFTWARE TESTING

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

COURSE CONTENT:

1. **Basics of Software Testing**
   - Introduction and Need of Testing
   - Basic Concepts in Testing
   - Levels of Testing
   - Testing Process
   - Software Testing Life Cycle Model
2. **Functional Testing and Structural Testing**
   - Introduction
   - Functional (Black Box) Testing : Meaning, Techniques - Boundary Value Analysis, Equivalence Class Partitioning, Decision Table Based Testing, Cause-Effect Graphing
   - Structural (White Box) Testing : Meaning, Techniques - Control Flow Testing, Data Flow Testing, Slice Based Testing, Mutation Testing
   - Black-box Testing Vs. White-box Testing
3. **Test Cases**
   - Test Cases – Meaning, Typical Test Case Parameters, Examples
   - Test Case Selection Criteria
   - Test Case Design Techniques, Test Suite
   - Generating Test Cases
   - Automated Test Data Generation
4. **Testing Tools**
   - Introduction to Testing Tools, Examples
   - Advantages and disadvantages of using Testing Tools
   - Types of Testing Tools
   - Open Source Software Testing Tools

REFERENCE BOOKS:

1. Yogesh Singh : "Software Testing", Cambridge University Press, 2012.
2. Paul C. Jorgensen : "Software Testing - A Craftsman's Approach", 3rd Edition, Auerbach Publications, 2013.

ADDITIONAL REFERENCE BOOKS:

1. S. A. Kelkar : "Software Quality and Testing", Prentice Hall of India, 2012.
2. M G LIMAYE : "Software Testing : Principles, Techniques and Tools", Tata McGraw-Hill Education Pvt. Ltd., 2011.

COURSE NO: PS03EINT32 ***w.e.f. June 2020***

WEB APPLICATION FRAMEWORKS

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

COURSE CONTENT:

1. **Client-side Web Application Framework - I**
   - Introduction to Angular framework
   - Setting up Project, project organization and management
   - Directives, Expressions, Controllers, Filters
   - Templates
2. **Client-side Web Application Framework - II**
   - MVVM Architecture
   - Data binding
   - Dependency injection
   - Routing
   - Modules, Forms, Includes, Views
   - Angular Applications
3. **CodeIgniter Framework-I**
   - Introduction to MVC
   - Introduction to CodeIgniter, Features and Objectives
   - Applications Flowcharts
   - Models, Views and Controller
   - Overview of Libraries
   - Helpers
4. **CodeIgniter Framework-II**
   - Database Handling
   - URL Routing
   - Error Handling
   - Form validation
   - Session management
   - Active record

REFERENCE BOOKS:

4. Brad Green and Syham Seshadri, "AngularJS", O'Reilly
5. Beginning AngularJS - Andrew Grant,Apress
6. CodeIgniter for Rapid PHP Application Development - David Upton, packtpub
7. Thomas Myer: Professional CodeIgniter – Wrox Publication
8. Internet reference for the relevant topics

SARDAR PATEL UNIVERSITY

M.Sc. (IT) Semester – IV

PS04CINT31 : Project Work