



SARDAR PATEL UNIVERSITY

M. Sc. (Information Technology)
(Under Choice Based Credit Scheme)

Semester - III

(Syllabus with effect from June 2020)



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. Software Testing YOGESH SINGH Cambridge University Press, 2012.
2. Software Testing - A Craftsman's Approach Paul C. Jorgensen, Third Edition Auerbach Publications, 2013.

ADDITIONAL REFERENCE BOOKS:

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

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:

1. Brad Green and Syham Seshadri, “AngularJS”, O’Reilly
2. Beginning AngularJS - Andrew Grant, Apress
3. CodeIgniter for Rapid PHP Application Development - David Upton, packtpub
4. Thomas Myer: Professional CodeIgniter – Wrox Publication
5. Internet reference for the relevant topics

MOBILE APPLICATION DEVELOPMENT

(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.

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.

COMPUTER GRAPHICS

(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, Addison-Wesley Publishing Company, 1993.

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 Methodologies
 - 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-medoids 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 Madiseti 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.

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Practicals