Enclosure – I

Shree Manibhai Virani and Smt. Navalben Virani Science College (Autonomous)
Affiliated to Saurashtra University, Rajkot

Department of Computer Science & Information Technology
B.Sc. INFORMATION TECHNOLOGY

For Students Admitted From A.Y. 2016-2017 & Onwards

SEMESTER - V

16UITCC20	**Core 12: Network Management & Information Security**	**4 hrs/wk**	**4 Credits**

Objectives:

To enable the students to

1. Provide an overview of information security and network security and management.
2. Examine the practical aspects of the issues involved in secure systems and networks and industry practices being adopted to protect information systems.
3. Gain the knowledge, skills and abilities to incorporate good information security practice in any organization.

Unit -1 Introduction to Information Security and Entity Authentication (10 hrs)

- Security Goal, Services: Attributes of Information Security, Authentication, Confidentiality, Integrity, Availability, Non Repudiation, and Access Control.
- Threats & Vulnerabilities: Security attacks, Unauthorized Access, Impersonation, Denial of Service Malicious Software, Viruses & Its types and security mechanisms
- Entity Authentication :Definitions, Types of authentication, Password Authentication, Password Vulnerabilities & Attacks, Brute Force & Dictionary Attacks Password Policy & Discipline. Alternate Approaches like Biometric authentication.
- Network Attacks : Buffer Overflow, IP Spoofing, TCP Session Hijacking, Sequence Guessing

Unit -2 Cryptography, Public key Infrastructure and Message Authentication (10 hrs)

- Cryptography Basics: Plain Text, Cipher Text, Encryption Algorithm, Decryption Algorithm Requirements for Cryptography, Cryptanalysis and attacks Conventional Symmetric Encryption Algorithms: Symmetric vs Asymmetric, Block and Stream ciphers, DES, Double and Triple DES, Stream Cipher: RC4 and RC5, Cryptographic Modes.
- Public Key Cryptography Principles & Applications, Algorithms: RSA, Diffe-Hellman Key Exchange, DSS, Elliptic-curve, One way Hash Functions: Message Digest MD5, SHA1, Digital Signatures, Public Key Infrastructure (PKI): Digital Certificates, Certificate Authorities.

Unit -3 Network configuration & Server Administration (10 hrs)

- What is IP address ,Types of IP address ,IPV4 : Class structure, sub netting, super netting
- What is routing, Routing protocols ;Exterior routing protocols : BGP, Interior routing protocol ,Distance vector routing: RIP, IGRP, EIGRP ,Link state routing: OSPF, ISIS
- Server Administration :Installation of server, Installation and configuration of Active Directory, Active Directory Installation & Configuration, Securing active directory domain services, Domains, Trees, Forests concept, Accounts(User, Group, Computer) Policy (Security and Audit),Logging Events, Creating network drive ,DNS & Installing DNS

Unit – 4 Network Management (10 hrs)

- Network Management Architecture & Applications , Management Standards and Models
- Network Management Functions –Configuration Management, Configuration Database & Reports, ASN.1.
- Network Monitoring Tools (e.g. WireShark, OpenNMS)

Unit – 5 Application Security, Firewalls and Cybercrime and Law (10 hrs)

- Web security Consideration, Secured Socket Layer and Transport layer security, Secured Electronic Transaction, Secured Mail: Pretty Good Privacy (PGP), S/MIME.
- Firewall Characteristics, Types of Firewalls: Packet Filtering Router, Stateful Inspection Firewall, Application Level Gateway or Proxy, Circuit level gateway, Screened Host Firewall System, Screened Subnet Firewall System.
- Cyber-crimes : Crimes against the computer, Crimes using a computer, Indian IT Act 2000, Objectives, Provisions, Offenses and grey areas.

Text Books

1. William, S. (2000). *Network security essentials: applications and standards*. Pearson Education India
2. Gollmann, Dieter, (1999),*"Computer Security"*, First Edition, John Wiley & Sons Ltd.
3. Micki Krause, Harold F. Tipton, (1999), "Handbook of Information Security Management", Auerbach Publications
4. Behrouz, A., & Forouzan, C. (2007). Network Security. Special Indian Edition.
5. *Glen, B.* (1998), MCSE Networking Essentials**,** Second Edition, New Riders Publications

Reference books:

1. Prosise, C., Mandia, K., & Pepe, M. (2003). *Incident response & computer forensics*.
2. Simson Garfield, (2002),*"Web Security, Privacy Commerce"*, 2nd Edition, O'Reilly Publications
3. Tiwari,R.K.,Sastri.P.K., K.V.,(2002), "Computer Crime and Computer Forensics", 1st Edition, Select Publishers
4. Forouzan, B. A.,(2009),*Data Communications and Networking*, 4th Edition, Tata McGraw Hill Publishing Company, New Delhi

16UITCC21	Core 13: Administration of SQL Server	4 hrs/wk	4 Credits

Objectives:

To enable the students to

1. Build and manage SQL Server databases
2. Retrieve and manipulate data with SQL queries
3. Back up and recover data
4. Secure and monitor databases
5. Replicate data over multiple servers with merge replication

Unit -1 1 Introduction of SQL Server **(10 hrs)**

- Introduction to DBMS
- Introduction to RDBMS
- Normalization and database designing
- Introduction to SQL
- Features of SQL server
- SQL Server Edition
- Shrinking and growing Database
- Active & Passive Cluster configuration

Unit -2 Managing Table and Accessing Data **(10 hrs)**

- SQL Commands and Datatypes
- Database
    - Create Database
- Table
    - Create, Alter & Dropping tables
- Data Manipulation Commands
    - Insert, Update, Delete
- Different type of constraints
    - Primary key, Foreign key, Check
- SELECT statement with
    - WHERE, Special operator like IN, BETWEEN, LIKE
- Join (join of two tables)
- Functions
- Triggers
- Index
- Backup and Restore

Unit – 3 Roles of DBA & Database Developers **(10 hrs)**

- Production DBA
- Development DBA
- Architect DBA
- ETL DBA
- OLAP DBA

- Basic Duties of DBA
    - Creating & Manage Users
- Basic knowledge of DBCC Commands
- What is Index?
- Types of Index

Unit – 4 Fundamentals of Backup and Restore (10 hrs)

- Backup Fundamentals
- Requirement of Backup
- Types of Backup
- Recovery Models
- What is Restore?
- What is Recovery?
- Restoring Database from Backup
- RAID
- SAN

Unit – 5 Transaction, Locking mechanism and High Availability of Server (10 hrs)

- What is Transaction?
- ACID Properties
- Isolation Levels
- Fundamentals of Locks
    - Row, Page & Table level Locks
- Disaster Recovery
- Failover Clustering
- Log Shipping
- What is replication
- Types of Replication

Text Books

1. *Ivan Bayross,* **SQL, PL/SQL the programming Language of Oracle**, BPB Publications
2. *Michael Lee, Gentry Bieker*, **Mastering SQL Server 2008**, Sybex

Reference Books

1. *Israel*, **Sql Server 2000 Design Study Guide**, BPB Publication

16UITCC22	Core 14: Web services API- JSON/XML (Self Study)	1 hrs/wk	4 Credits

Objectives:

To enable the students to

1. Understand open protocols and standards used for exchanging data between applications or systems in web service.
2. Design and code data transfer scripts using XML languages for the transfer of data over business networks and the Internet.
3. Understand what JSON used for data interchange.
4. Comprehend the formats for requests to and responses from a web service that uses a SOAP interface.
5. Understanding REST, Learning how to design a REST API

Unit -1 Introduction to Web Services

- What is Web Service?
- Type of Web Service
- Web Services Advantages
- Web Service Architecture
- Web Service Characteristics

Unit - 2 XML

- Overview of XML, XML document, XML Element
- What is DTD?, DTD Elements, DTD Attributes, DTD Entities
- What is XML Parsing?
- Various other XML Binding API's

Unit - 3 JSON

- Overview of JSON
- JSON Syntax, Data Types
- Objects, Schema, Serializing into JSON
- JSON Parsing
- JSON Advantages and Disadvantages

Unit - 4 Difference types of Web Services

- SOAP Introduction, Advantages of SOAP, SOAP Building blocks, SOAP Message Structure
- REST Introduction, Restful Methods, Advantages of REST, REST architecture
- Web Service Components
- SOAP vs REST
- When to use REST and when to use SOAP

Unit - 5 Web Service (WS) Security and Standards

- Security Threats and Countermeasure
- Web Service Security Standards
- How to build secure web services
- Web Service Security Best Practices
- SOA (Service Oriented Architecture) Principles

Text Books

1. *By Ethan Cerami,* **Web Services Essentials - Distributed Applications with XML-RPC, SOAP, UDDI & WSDL,** O'Reilly Media
2. *Ethan Cerami,* **Web Services Essentials** [1st Edition], O'Reilly Media
3. *Sam Ruby, Leonard Richardson,* 2007, **Restful Web Services** [First Edition], O'Reilly Media

Reference Books

1. *Robert Daigneau,* 2011, **Service Design Patterns: Fundamental Design Solutions for SOAP/WSDL and RESTful Web Services**, [1st Edition], Addison-Wesley Professional, ISBN-10: 032154420X, ISBN-13: 978-0321544209
2. *Frank P. Coyle,* **XML, Web Services, and the Data Revolution**
3. *Subbu Allamaraju,* **RESTful Web Services Cookbook: Solutions for Improving Scalability and Simplicity**, [1st Edition], O'Reilly Media

DISCIPLINE SPECIFIC ELECTIVE CORE - 1

(Student shall select any one of the following subject as Elective in **5th semester**)

S. No	Semester	Theory	
		Course Code	**Course**
1.	V	16UITDC01 /	Advanced JAVA Programming /
		16UITDC02	Programming with ASP.NET

16UITDC01	DSE Core 1: Advanced JAVA Programming	4 hrs/wk	4 Credits

Objectives:

To enable the students to

1. Design console based, GUI based and web based applications.
2. Understand Integrated Development Environment.
3. Create, debug and run multi-tier and enterprise- level applications
4. Create MVC based application
5. Understand current trends of application development using Java platform

Unit – 1 Database Connectivity (JDBC Programming) (10 hrs)

- The JDBC Connectivity Model
- JDBC driver types, JDBC API
- Database Programming: Connecting to the Database
- Creating a SQL Query, Executing SQL Queries, Getting the Results
- Updating Database Data
- Error Checking and the SQLException Class
- Statement Interface, PreparedStatement, CallableStatement
- ResultSet Interface, Updatable Result Sets
- Use of Type-1 and Type-4 driver for MySQL with GUI

Unit - 2 Servlet API and Overview (10 hrs)

- Servlet Model: Overview of Servlet,Servlet Life Cycle
- HTTP (Request and Response interface) Methods Structure
- Deployment descriptor(web.xml)
- ServletException
- ServletContext and ServletConfig interface
- Attributes in Servelt
- Servlet Collaboration (RequestDispatcher interface)
- The Filter API: Filter, FilterChain, Filter Config
- Cookies and Session Management: Understanding state and session
- Understanding Session Timeout and Session Tracking

Unit - 3 Java Server Pages **(10 hrs)**

- JSP Overview: The Problem with Servlets
- Life Cycle of JSP Page
- JSP Processing
- JSP Application Design with MVC
- JSP Directives, JSP Action, JSP Implicit Objects
- JSP Form Processing (GET & POST)
- JSP Session and Cookies Handling
- JSP Database Access
- JSP Exception Handling(Error Handling)

Unit - 4 Hibernate 4.0 **(10 hrs)**

- Overview of Hibernate
- Hibernate Architecture
- Hibernate Mapping Types
- Hibernate O/R Mapping
- Hibernate Annotation
- Hibernate Query Language

Unit - 5 Java Web Frameworks: Spring MVC **(10 hrs)**

- Overview of Spring
- Spring Architecture
- Bean Life Cycle
- XML Configuration on Spring
- Aspect – oriented Spring
- Managing Database, Managing Transaction

Text Books

1. *Jim Keogh,* 2007, **The Complete Reference J2EE [2nd Edition],** Tata McGraw Hill publishers
2. *Craig Walls,* 2007, **Spring in Action,** DreamTech press

Reference Books

1. *Craig Walls,* 2007, **Spring in Action,** DreamTech press
2. *Cameron McKenzie,* 2008, **Hibernate Made Easy**, hiberbook.com

Web References:

1. www.tutorialspoint.com
2. www.javatpoint.com

16UITDC02	DSE Core 1: Programming with ASP.NET	4 hrs/wk	4 Credits

Objectives:

To enable the students to

1. Design & develop web based applications.
2. Understand .NET framework.
3. Understand ASP.NET Controls

Unit -1 Overview of the ASP.NET, Framework & Coding Standards (10 hrs)

- Introduction of different Web Technology
- What is Asp.Net
- How Asp.Net Works
- Use of visual studio
- Different Languages used in Asp.Net.
- NET Framework Class Library.
- Overview of coding standards follows during programming
- Creating master pages
- Creating default contents
- Nesting master pages
- Registering master pages in web configuration

Unit -2 ASP.NET Standard Controls, Rich Controls & Navigation Controls (10 hrs)

- Label Controls
- Literal Controls
- Bulleted List
- Textbox controls
- RadioButton and RadioButtonList Controls
- CheckBox and CheckBoxList Controls
- Button controls
- LinkButton Control
- ImageButton Control
- Using Hyperlink Control
- DropDownList
- ListBox
- Image Control
- Image Map Control
- Using Panel Control
- Using Hyperlink Control
- Understanding Site Maps
- Using the Sitemap Path Control
- Formatting the Sitemap Path Control
- Using the Menu Control
- Using Tree View Control

- FileUpload Control
- Calendar Control
- Adrotator Control

Unit -3 ASP.NET Validation Controls & State Management (10 hrs)

- Required Field Validator Control
- Regular Expression Validator Control
- Compare Field Validator Control
- Range Validator Control
- Validation Summary Control
- Custom Validator Control
- State Management

Unit - 4 ADO.NET & Database (10 hrs)

- Creating database connections
- Ado.NET Architecture
- Grid View Control
- Repeater Control
- Data List Controls
- Details View Controls
- Form View Controls

Unit -5 Web service, Configuration & Deployment (10 hrs)

- Overview of XML
- Creating /Reading/Deleting XML Files
- Web Services
- Introduction to Web.config & Global.asax
- Tracing
- Authentication
- Authorization
- Custom Error handling
- Deploying Application on Web Server

Text Books

3. *ASP.NET 4 Unleashed,* 2010, **ASP.NET 4 Unleashed,** Sams Publishing
4. *Ramesh Bangia,* 2012, **Learning ASP.Net and C#.Net,** Khanna Book Publishing

Reference Books

3. *Matthew Macdonald,* 2017, **ASP.NET-The Complete Reference,** McGraw Hill Education

16UITCC23	**Core Practical 9: Administration of SQL Server Practical**	**4 hrs/wk**	**2 Credits**

- Practical based on SQL Server

16UITDC03 / 16UITDC04	**DSE Core Practical 1: Advanced JAVA Programming Practical / Programming with ASP.NET Practical**	**4 hrs/wk**	**2 Credits**

- Practical based on Advanced JAVA / ASP.NET

SEMESTER – VI

16UITCC25	Core 16: Mobile Computing using Android	4 hrs/wk	4 Credits

Objectives:

To enable the students to

1. Understand fundamental of Android Operating System
2. Design and Develop Android Mobile Application.
3. Understand of SQLite and Connectivity with it.
4. Understand Location Based Service & Notifications in android.
5. Developing web service and retrieving data using JSON
6. Packaging and distributing android application

Unit -1 Introduction to Android & Android Application Design (10 hrs)

- The Open Handset Alliance
- The Android Platform
- Overview of Android IDE
- Android SDK
- Building a sample Android application
- Anatomy of an Android applications
- Android terminologies
- Application Context, Activities, Services, Intents, Broadcast Receiver
- Android Manifest File, Permissions and its common settings
- Working with different types of resources

Unit -2 Android User Interface Design (10 hrs)

- Overview of User Interface in Android
- Widget of Android (TextView, EditText, AutoCompleteTextView, Button, ImageButton, CheckBox, ToggleButton, RadioButton, RadioGroup, ProgressBar, Spinner, TimePicker, DatePicker)
- Android Layouts (Relative Layout, Linear Layout, Table Layout, Frame Layout, Absolute Layout)

Unit – 3 Data Storage & SQLite Connectivity (10 hrs)

- Types of Storage in Android
- Using Android Data and Storage APIs
- Managing data using SQLite
- Sharing Data Between Applications with Content Providers

Unit – 4 API, Location Based Services (LBS) & Notifications (10 hrs)

- Networking API, Web API, Telephony API
- Using Global Positioning Services (GPS)
- Geo-coding Locations
- Mapping Locations
- Many more with location based services

- Notifying the user
- Notifying with the status bar
- Vibrating the phone
- Blinking the lights
- Customizing the notifications

Unit – 5 Web Service and Deployment of applications (10 hrs)

- Overview of Web Services
- Restful web service using PHP & MySQL
- JSON Parsing
- Publish android application

Text Books

1. *Joseph Annuzzi, Lauren darcey, Shane Conder,* **Advanced Android Application Development**, Wesley
2. *Ian F. Darwin,* **Android cookbook**, O'Reilly
3. *Jay A Kreibich,* 2010, **Using SQLite** , O′Reilly

Reference Books

1. *Reto Meier*, 2010, **Professional Android 2 Application Development**, Wiley
2. The Android Developer's CookBook - Building Application with Android SDK – **2nd Edition**, *Wesley*
3. **Mobile Computing using Android,** Bharat & Company

16UITCC26	Core 17: Software Testing and Project Management	4 hrs/wk	4 Credits

Objectives:

To enable the students to

1. Understand the concepts of Test Automation and Perform Practically.
2. Understand Importance of Project Planning, Monitoring and Controlling.
3. Understand Importance matured Software Engineering (Quality Assurance).
4. Analyse Risk and Mitigation, Monitoring and Management of it.
5. Apply testing tools to rise quality of Software.

Unit -1 Project Economics (10 hrs)

- Concept of Project Management.
- Empirical Project Estimation Techniques
- Decomposition Techniques
- Problem Based Estimation, Function Oriented metrics, Size Oriented Metrics.
- Automated Estimation tools

Unit -2 Project Management (10 hrs)

- Introduction, Effort Estimation Techniques
- Task Network and Scheduling Methods, Timeline Chart (Gantt chart), Tracking the Schedule, PERT Chart.
- Definition of the project, Project specification and parameters, Principles of Project management, Project management life cycle.
- Risk Concepts and Identification, Risk Assessment and Control, Risk Components and Drivers, Risk Mitigation, Monitoring and Management.

Unit - 3 Software Testing Techniques (10 hrs)

- Software Testing Fundamentals
- Test case design
- White Box Testing
- Basis Path testing
- Control Structure Testing
- Black Box Testing
- Testing for Specialized environment, Architecture and Applications.

Unit - 4 Software Testing Strategies and Concept of Quality Assurance (10 hrs)

- A Strategic approach to software testing.
- Strategic Issues
- Unit Testing
- Integration Testing
- Validation Testing
- System Testing

Unit - 5 Use of Testing Tools with Practical Case Study (10 hrs)

- Static and Dynamic Testing, Comparison of Manual and Automated Testing, Automated Testing Process, Test Automation and its benefits, Test Plan, Test Script and Regression Testing, Functional and Non Functional Testing tools.
- Introduction to Win runner/Quick Test Professional/Load Runner or any open source testing tool.
- Student has to prepare Test Cases after learning new software to test as a part of Functional Testing. Create and synchronize test script which includes these test cases and Perform Test with adequate number of Test Cases. Test Cases should include both type of testing black box and white box. Later on Test can be extend with Performance Testing Tool. Student has to submit documentation which includes Test Plan, Test Summary report along with set of test cases.

Text Books

6. *Priyank Doshi,* **SAD, Software Quality Assurance and Testing**, Bharat & Co. [ISBN No. 978-93-81786-36-9]
7. *Roger Pressman,* **Software Engineering - A Practitioner's Approach**, McGraw Hill Education
8. *John J. Rakos*, 1998, **Software Project Management for Small to Medium Sized Projects**, Prentice Hall [ISBN: 0138261733]
9. *Walker Royce,*2001, **Software Project Management: A Unified Framework,** Addison Wesley Professional [ISBN-10: 0201309580, ISBN-13: 9780201309584]
10. *Pankaj Jalote,* 2001, **Software Project Management in Practice**, Addison-Wesley Professional [ISBN-10:0-201-73721-3, ISBN-13: 9780201737219]

Reference books:

1. *James A. Senn.,* **Analysis & Design of Information System**, McGraw Hill Education
2. *RajibMall*, **Fundamentals of Software Engineering**, Prentice Hall India Learning Private Limited
3. *Jasson Roff*, **UML – A Beginner's Guide**, McGraw Hill Education

DISCIPLINE SPECIFIC ELECTIVE CORE - 2

(Student shall select any one of the following subject as Elective in **6th semester**)

S. No	Semester	Theory	
		Course Code	**Course**
1.	VI	16UITDC05 /	MVC Design Pattern in PHP /
		16UITDC06	MVC Design Pattern in .NET

16UITDC05	DSE Core 2: MVC Design Pattern in PHP	4 hrs/wk	4 Credits

Objectives:

To enable the students to

1. Demonstrate the use of the CodeIgniter MVC Framework.
2. Design & develop MVC based application.
3. Be able to design, write, compile, execute and test Web Application in mvc framework.
4. Understand current trends of application development using php platform

Unit -1 PHP with OOP and Introduction to CodeIgniter (10 hrs)

- Object, classes, Creating classes and Instantiation, Setting Properties and methods
- Understanding public, private, protected properties and methods
- Magic Methods in OOP and Inheritance.
- Introduction of MVC.
- CodeIgniter URLs.
- CodeIgniter specific files and structure.
- Initial Setup and Configuration.
- First CI Application.

Unit -2 Working With Libraries (10 hrs)

- What is library in codeignter? Why library?
- Benchmarking Class
- Input(form validation) and Security Class
- Email Class
- File Uploading Class
- Image Manipulation Library
- Session Class

Unit – 3 Working with Helper Functions (10 hrs)

- Date Helper, Email Helper
- Directory helper, Form Helper
- Security helper, Url Helper
- HTML helper

Unit – 4 Form Validation and Database Interaction (10 hrs)

- Reasons for validating a form
- Using the Form Validation Library
- Saving sets of validation rules to config file
- Using callbacks
- Database interaction
- Performing simple queries
- Returning values
- Result helper functions
- Active Record and Active Record caching
- Method chaining
- Manipulating databases

Unit – 5 User Authentication and Modular Extensions - HMVC (10 hrs)

- An application to implement authentication with database connectivity.
- HMVC introduction
- Key advantages to implementing the HMVC pattern
- Setting up HMVC in CodeIgniter

Text Books

1. *Adam Griffiths*, **CodeIgniter 3.1 Professional Development**, Packt Publications
2. *Rob Foster*, **CodeIgniter 3 Cookbook**, Packt Publishing
   ISBN-10: 1782162305 ISBN-13: 978-1782162308

Reference Books

1. *Thomas Myer*, **Professional Codeigniter**, Wrox Publication author :

16UITDC06	DSE Core 2: MVC Design Pattern in .NET	4 hrs/wk	4 Credits

Objectives:

To enable the students to

1. Understand the MVC design pattern and how it's applied in ASP.NET MVC
2. Recognize the benefits of using ASP.NET MVC
3. Become equipped to make good choices about model design and use of Microsoft data access technologies
4. Learn how to build a compelling and maintainable HTML user interface using both the ASP.NET and new Razor view engine

Unit -1 Overview of the ASP.NET (10 hrs)

- Introduction of different Web Technology
- What is ASP.NET MVC
- Role of Model, View, and Controller
- How ASP.NET MVC Works
- Benefits of using ASP.NET MVC
- Setting up and Installing ASP.NET MVC
    - Installing Internet Information Server
    - Installation of ASP.NET MVC
    - Application Setting in IIS

Unit -2 Getting Started with MVC (10 hrs)

- ASP.NET MVC project templates
- Understanding the structure of an ASP.NET MVC project
- Naming conventions
- Creating views
- Defining controllers
- Defining a data model
- Overview of coding standards follows during programming
- Creating an application in MVC
    - Creating strongly-typed views
    - Understanding URLs and action methods
    - Using HTML helpers
    - Handling form post-backs
    - Data validation
- Razor View Engine
    - Razor Basics
    - Razor design goals
    - Implementation of Razor view
    - Razor syntax
    - Accessing Model Data in Razor views

Unit -3Strength ASP.NET MVC Applications (10 hrs)

- ASP.NET application architecture best practices
- Implementing a Repository and Entity Framework Data Model
- Using Dependency Injection
- Implementing a custom controller factory
- View Techniques
    - Defining and using custom HTML Helpers
    - Defining a layout / MVC Master Page
    - Using Styles
    - Defining and using partial views
    - Razor Helper Method syntax

Unit -4 Implementing Navigation in MVC web apps (10 hrs)

- Defining view-model classes
- Implementing Data Filtering in a Controller
- Understanding the Routing mechanism
- Adding custom entries to a route table
- Defining defaults, parameters, and validation
- Generating URLs and Hyperlinks
- Custom Route constraints

Unit -5 MVC State Management & AJAX and jQuery with ASP.NET MVC (10 hrs)

- Using hidden fields
- Session and Application State
- Custom model bindings
- Using AJAX and jQuery with ASP.NET MVC
    - Overview of AJAX and ASP.NET MVC
    - Unobtrusive AJAX
    - Using AJAX Action Links
- Deployment
    - Deploying application on Web Server

Text Books

1. *Jon Galloway, Phil Haack, Brad Wilson, K. Scott Allen, Scott Hanselman,* **Professional ASP.NET MVC**, WROX

Reference Books

1. *Jeffrey Palermo, Jimmy Bogard, Eric Hexter, Matthew Hinze, Jeremy Skinner* **ASP.NET MVC 4 in Action**, Manning

16UITCC27	**Core Practical 10: Mobile Computing using Android Practical**	**4 hrs/wk**	**2 Credits**

- Practical based on Android

16UITDC07 / 16UITDC08	**DSE Core Practical 2: MVC Design Pattern in PHP Practical / MVC Design Pattern in .NET Practical**	**4 hrs/wk**	**2 Credits**

- Practical based on MVC Design Pattern in PHP / MVC Design Pattern in .NET

16UITCC28	**Project**	**6 hrs/wk**	**4 Credits**