DISCIPLINE SPECIFIC CORE COURSE – DSC-10: Software Modelling

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Software Modelling	4	3	0	1	Class XII	NIL

***Learning objectives*:**

1. *Design and develop software systems (including analysis, design, construction, maintenance, quality assurance and project management) using the appropriate theory, principles, tools and processes.*
2. *Use appropriate computer science and mathematics principles in the development of software systems.*
3. *Solve problems in a team environment through effective using various tools, techniques and processes.*
4. *Introduce the current issues presently involved in effectively performing duties as a software practitioner in an ethical and professional manner for the benefit of society.*
5. *Practice the lifelong learning needed in order to keep current as well as new challenging issues in real life scenario.*
6. *Develop software in at least one application domains like Healthcare, safety, Society, Legal, Environment, Communication etc.*

Learning Outcomes:

1. *Illustrate the strengths and weaknesses of certain models and logics including state machines, algebraic and process models, and temporal logic;*
2. *Describe appropriate abstract formal models for certain classes of systems, describe abstraction relations between different levels of description, and reason about the correctness of refinements;*
3. *Prove elementary properties about systems described by the models introduced in the course.*

Unit-I **(10 hours)**

Introduction: The Evolving Role of Software, Software Characteristics, Changing Nature of Software, Software Engineering as a Layered Technology, Software Process Framework, Framework and Umbrella activities, process models, Capability Maturity Model Integration (CMMI). Software Requirement Analysis, Initiating Requirement Engineering Process, Requirement Analysis and Modeling Techniques, Flow Oriented Modeling, Need for SRS, Characteristics and Components of SRS.

Unit-II **(7 hours)**

Software Project Management: Estimation in Project Planning Process, Project Scheduling. Software Risks, Risk Identification, Risk Projection and Risk Refinement, RMMM Plan.

Unit-III **(8 hours)**

Quality Management Quality Concepts, Software Quality Assurance, Software Reviews, Metrics for Process and Projects.

Unit-IV **(10 hours)**

Design Engineering Design Concepts, Architectural Design Elements, Software Architecture, Data Design at the Architectural Level and Component Level, Mapping of Data Flow into Software Architecture, Modeling Component Level Design.

Unit-V **(10 hours)**

Testing Strategies & Tactics: Software Testing Fundamentals, Strategic Approach to Software Testing, Test Strategies for Conventional Software, Validation Testing, System Testing, Black-Box Testing, White-Box Testing and their type, Basis Path Testing.

***Referenced Books**:*

1. R.S. Pressman, Software Engineering: A Practitioner's Approach (7th Edition), McGraw-Hill, 2009.

2. P. Jalote, An Integrated Approach to Software Engineering (2nd Edition), Narosa Publishing House, 2003.

3. K.K. Aggarwal and Y. Singh, Software engineering (revised 2nd Edition), New Age International Publishers, 2008.

4. R. Mall, Fundamentals of Software Engineering (2nd Edition), Prentice-Hall of India, 2004.

List of Practicals :(30 hours)

A project report needs to be submitted which includes the following:

1. Problem Statement and Process Model
2. Requirement Analysis:
    a. Creating a Data Flow
    b. Data Dictionary, Use Cases
3. Project Management:
    a. Computing FP
    b. Effort
    c. Schedule, Risk Table, Timeline chart
4. Design Engineering:
    a. Architectural Design
    b. Data Design, Component Level Design

DISCIPLINE SPECIFIC CORE COURSE – DSC-11: FULL STACK WEB DEVELOPMENT -1

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
FULL STACK WEB DEVELOPMENT -1	4	3	0	1	Class XII	DSC-08

***Learning objectives*:**

1. To introduce the fundamentals of Internet, and the principles of web design.
2. To construct basic websites using JQuery and AJAX.

Learning Outcomes:

1. *Assimilate and master latest framework like frameworks like js, Node.js, and Mongo DB.*
2. *Build Responsive Web application using Angular Typescript*
3. *Learn Angular Binding and events with templates*
4. *Use Mongo DB queries, tools and apply CRUD operations.*

UNIT I **(10 hours)**

Introduction to JQuery: JQuery Introduction, JQuery Syntax, JQuery Selectors, JQuery Events, JQuery Effects- JQuery Hide/Show, JQuery Fade, JQuery Slide(), JQuery Animate, JQuery Stop(), JQuery Callback, JQuery Chaining, JQuery AJAX- JQuery AJAX Introduction, JQuery Load, JQuery Get/Post, JQuery HTML, JQuery Get, JQuery Set, JQuery Add, JQuery Remove, JQuery CSS Classes, JQuery CSS(), JQuery forms.

UNIT II **(5 hours)**

Introduction to Angular JS: Angular Architecture, Building blocks of Angular, Angular CLI and commands, Angular Modules, Understanding files in Angular, Angular forms.

UNIT III **(10 hours)**

Working of Angular Applications: Angular App Bootstrapping ,Angular Components, Creating A Component Through Angular CLI , Ways to specify selectors , Template and styles , Installing bootstrap to design application , Data Binding , Types of Data Binding , Component Interaction using @Input and @Output decorator , Angular Animations , Component Life-cycle Hooks , Angular Directives.

UNIT IV **(10 hours)**

Introduction of Mongo DB: Overview , Design Goals for Mongo DB Server and Database, Mongo DB Tools , How to modularize code by separating routes , Usage of various Mongo DB Tools available with Mongo DB Package , Mongo DB Development Architecture.

UNIT V **(10 hours)**

Crud Operations : Mongo DB CRUD Introduction, Mongo DB Datatypes , Analogy between RDBMS & Mongo DB Data Model, Mongo DB Data Model (Embedding & Linking), Challenges for Data Modelling in Mongo DB.

References

1. Node.js, Mongo DB and Angular Web Development: The definitive guide to using the MEAN stack to build web applications (Developer's Library) - by Brad Dayley , Addison-Wesley; 2nd edition

2. JQuery Cookbook by Cody Lindley, O'Reilly Media, Inc.

List of Practicals: (30 hours)

A web development project implementing following technologies:

- JQuery
- JavaScript
- Angular JS
- Mongo DB

DISCIPLINE SPECIFIC CORE COURSE – DSC-12:
Data communication and Networks

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Data Communication and Networks	4	3	0	1	Class XII	NIL

***Learning objectives*:**

1. *The objective of the course is to equip the students with a general overview of the concepts and fundamentals of computer networks.*
2. *Familiarize the students with the standard models for the layered approach to communication between machines in a network and the protocols of the various layers*

Learning Outcomes:

1. *Understand the basics of data communication, networking, internet and their importance*
2. *Analyze the services and features of various protocol layers in data networks.*
3. *Differentiate wired and wireless computer networks*
4. *Analyze TCP/IP and their protocols.*
5. *Recognize the different internet devices and their functions.*
6. *Identify the basic security threats of a network.*

UNIT-I **(8 hours)**

Basics of Networking: Network Concept, Benefits of Network, Network classification (PAN, LAN, MAN, WAN), Peer to Peer, Client Server architecture,
Transmission media: Guided & Unguided, Network Topologies.
Networking terms: DNS, URL, client server architecture, TCP/IP, FTP, HTTP, HTTPS, SMTP, Telnet
OSI and TCP/IP Models: Layers and their basic functions and Protocols, Comparison of OSI and TCP/IP. Networking Devices: Hubs, Switches, Routers, Bridges, Repeaters, Gateways and Modems, ADSL.

UNIT-II **(7 hours)**

Ethernet Networking: Half and Full-Duplex Ethernet, Ethernet at the Data Link Layer, Ethernet at the Physical Layer.
Switching Technologies: layer-2 switching, address learning in layer-2 switches, network loop problems in layer-2 switched networks, Spanning-Tree Protocol, LAN switch types and working with layer-2 switches, Wireless LAN

UNIT- III **(15 hours)**

Internet layer Protocol: Internet Protocol, ICMP, ARP, RARP.
IP Addressing: Different classes of IP addresses, Sub-netting for an internet work, Classless Addressing. Comparative study of IPv4 & IPv6.
Introduction to Router Configuration. Introduction to Virtual LAN.

UNIT- IV **(15 hours)**

Transport Layer: Functions of transport layer, Difference between working of TCP and UDP.
Application Layer: Domain Name System (DNS), Remote logging, Telnet, FTP, HTTP, HTTPS.

References:

1. Tananbaum A.S, "Computer Networks" 3rd Ed. PHI, 1999
2. Dr. Sanjay Sharma, "A Course in Computer Network" S. K. Kataria & Sons
3. Todd Lammle, "CCNA Cisco Certified Network Associate Study Guide", SYBEX.
4. A Forouzan, "Data Communications & Networking",4th Ed, Tata McGraw Hill, 2007

List of Practicals: (30 hours)

Introduce students to any network simulator tool and do the following:

1. To Study basic network command and Network configuration commands.
2. To study and perform PC to PC communication.
3. Create a Network Using Bluetooth-(Piconet/Scatternet)
3. To create Star topology using Hub and Switch.
4. To create Bus, Ring, Tree, Hybrid, Mesh topologies.
5. Perform an initial Switch configuration.
6. Perform an initial Router configuration.
7. To implement Client Server Network.
8. To implement connection between devices using router.
9. To perform remote desktop sharing within LAN connection.