Savitribai Phule Pune University
Third Year of Information Technology (2019 Course)
(With effect from Academic Year 2021-22)

Semester-VI

Course Code	Course Name	Teaching Scheme (Hours/ week)			Examination Scheme and Marks						Credit Scheme			
		Lecture	Practical	Tutorial	Mid-Sem	End-Sem	Term Work	Practical	Oral	Total	Lecture	Practical	Tutorial	Total
314451	Computer Networks& Security	03	-	-	30	70	-	-	-	100	03			03
314452	Data Science and Big Data Analytics	03	-	-	30	70	-	-	-	100	03			03
314453	Web Application Development	03	-	-	30	70	-	-	-	100	03			03
314454	Elective-II	03	-	-	30	70	-	-	-	100	03			03
314455	Internship	-	04	-	-	-	100	-	-	100		04		04
314456	Computer Networks& Security-Lab	-	04	-	-	-	25	-	50	75		02		02
314457	DS & BDA-Lab	-	02	-	-	-	25	25	-	50		01		01
314458	Laboratory Practice-II	-	04	-	-	-	50	25	-	75		02		02
314459	Audit Course 6	-	-	-	-	-	-	-	-	-	-	-	-	-
										Total	12	09	-	21
	Total	12	14	-	120	280	200	50	50	700	12	09	-	21

Abbreviations: TH: Theory, TW: Term Work, PR: Practical , OR: Oral, TUT: Tutorial

Elective-II:
314454A- Artificial Intelligence
314454B- Cyber Security
314454C -Cloud Computing
314454D- Software Modeling and Design

Audit Course 6:
314459A - Green and Unconventional Energy
314459B - Leadership and Personality Development
314459C- Foreign Language-(Japanese Language- IV)

Laboratory Practice-II:
Assignments from Web Application Development and Elective-II.

Note: Students of T.E. (Information Technology) can opt any one of the audit course from the list of audit courses prescribed by BoS (Information Technology)

Savitribai Phule Pune University, Pune
Third Year Information Technology (2019 Course)
314453: Web Application Development

Teaching Scheme:	Credit Scheme:	Examination Scheme:
Theory (TH) : 3 hrs/week	03 Credit	Mid_Semester : 30 Marks End_Semester : 70 Marks

HOME

Prerequisite Courses:

1. Programming languages C++, Java.

Companion Course:

1. Advanced Database Management system
2. Design Thinking

Course Objectives: -

1. To familiarize students with Web Programming basic concepts
2. To learn and understand Web scripting languages.
3. To explore the Front end& Backend web programming skills.
4. To understand and learn Mobile web development.
5. To understand and learn Web application deployment.

Course Outcomes: -

On completion of the course, students will be able to–

CO1: Develop Static and Dynamic website using technologies like HTML, CSS, Bootstrap.
CO2: Demonstrate the use of web scripting languages.
CO3: Develop web application with Front End & Back End Technologies.
CO4: Develop mobile website using JQuery Mobile.
CO5: Deploy web application on cloud using AWS.

COURSE CONTENTS

Unit I	INTRODUCTION TO WEB TECHNOLOGIES	(06 hrs)

HTML: Getting started with HTML, Why HTML, Tags and Elements, Attributes, Properties, Headings list, Links, Tables, Images, HTML Form, Media (Audio, Video), Semantic HTML5 Elements.

CSS: Why CSS, Types of CSS, How to use CSS, Properties, Classes, Child-Class (Nested CSS), Colors, Text, Background, Border, Margin, Padding, Positioning (flex, grid, inline, block), Animation, Transition.

BOOTSTRAP: Why Bootstrap, CSS over Bootstrap, How to Use Bootstrap, Bootstrap Grid System, Bootstrap Responsive, Bootstrap Classes, Bootstrap Components (i.e., Button, Table, List, etc.), Bootstrap as a Cross Platform.

W3C: What is W3C , How W3C handles/Supports Web Technologies.

Mapping of Course Outcomes for Unit I	**CO1**	
Unit II	**WEB SCRIPTING LANGUAGES**	**(06 hrs)**

JavaScript: Introduction to Scripting languages, Introduction to JavaScript (JS), JS Variables and Constants, JS Variable Scopes, JS Data Types, JS Functions, JS Array, JS Object, JS Events.

Advanced JavaScript: JSON - JSON Create, Key-Value Pair, JSON Access, JSON Array, JS Arrow Functions, JS Callback Functions, JS Promises, JS Async-Await Functions, JS Error Handling.

AJAX: Why AJAX, Call HTTP Methods Using AJAX, Data Sending, Data Receiving, AJAX Error Handling.

JQUERY : Why JQuery, How to Use, DOM Manipulation with JQuery, Dynamic Content Change with JQuery, UI Design Using JQuery.

Mapping of Course Outcomes for Unit II	**CO2**	
Unit III	**FRONT END TECHNOLOGIES**	**(06 hrs)**

Front-End Frameworks: What is web framework? Why Web Framework? Web Framework Types.

MVC: What is MVC, MVC Architecture, MVC in Practical, MVC in Web Frameworks.

TypeScript: Introduction to TypeScript (TS), Variables and Constants, Modules in TS.

AngularVersion 10+: Angular CLI, Angular Architecture, Angular Project Structure, Angular Lifecycle, Angular Modules, Angular Components, Angular Data Binding, Directives and Pipes, Angular Services and Dependency Injections (DI), Angular Routers, Angular Forms.

ReactJS: Introduction to ReactJS, React Components, Inter Components Communication, Components Styling, Routing, Redux- Architecture, Hooks- Basic hooks, useState() hook, useEffect() hook useContext() hook.

Mapping of Course Outcomes For Unit III	**CO3**	
Unit IV	**BACK END TECHNOLOGIES**	**(06 hrs)**

Node.JS: Introduction to Node.JS, Environment Setup, Node.JS Events, Node.JS Functions, Node.JS Built-in Modules, File System, NPM, Install External Modules, Handling Data I/O in Node.JS, Create HTTP Server, Create Socket Server, Microservices- PM2.

ExpressJS: Introduction to ExpressJS, Configure Routes, Template Engines, ExpressJS as Middleware, Serving Static Files, REST HTTP Method APIs, Applying Basic HTTP Authentication, Implement Session Authentication.

MongoDB: NoSQL and MongoDB Basics, MongoDB-Node.JS Communication, CRUD Operations using Node.JS, Mongoose ODM for Middleware, Advanced MongoDB.

Mapping of Course Outcomes for Unit IV	**CO3**	
Unit V	**MOBILE WEB DEVELOPMENT**	**(06 hrs)**
Mobile-First: What is Mobile-First? What is Mobile Web? Understanding Mobile Devices and Desktop. **JQuery Mobile:** Introduction to the jQuery Mobile Framework, Set-up jQuery Mobile, Pages, Icons, Transitions, Layouts Widgets, Events, Forms, Themes, Formatting Lists, Header and Footer, CSS Classes, Data Attributes, Building a Simple Mobile Webpage.		
Mapping of Course Outcomes for Unit V	**CO4**	
Unit VI	**WEB APPLICATION DEPLOYMENT**	**(06 hrs)**
Cloud: AWS Cloud, AWS Elastic Compute, AWS Elastic Load Balancer and its types, AWS VPC and Component of VPC, AWS storage, Deploy Website or Web Application on AWS, Launch an Application with AWS Elastic Beanstalk.		
Mapping of Course Outcomes for Unit VI	**CO5**	

Text Books:

1. Kogent Learning Solutions Inc, Web Technologies: HTML, JAVASCRIPT, PHP, JAVA, JSP, XML and AJAX, Blackbook, Dreamtech Press, Second Edition, ISBN: 9788177228496.
2. Raymond Camden, Andy Matthews, JQuery Mobile Web Development Essentials, Packt Publishing, Second Edition, 9781782167891.

Reference Books:

1. Steven M. Schafer, “HTML, XHTML and CSS”, Wiley India Edition, Fourth Edition,978- 81-265-1635-3
2. Dr.Hiren Joshi, Web Technology and Application Development, DreamTech, First,ISBN:978-93-5004-088-1
3. Steven M. Schafer, “HTML, XHTML and CSS”, Wiley India Edition, Fourth Edition,978- 81-265-1635-3
4. Ivan Bayross, “Web Enabled Commercial Application Development Using HTML, JavaScript,DHTML and PHP, BPB Publications,4th Edition, ISBN:978-8183330084.
5. Brain Fling, Mobile Design and Development, O'REILLY, First Edition, ISBN: 13:978-81- 8404-817-9
6. Adam Bretz& Colin J Ihrig, Full Stack Javascript Development with MEAN, SPD, First Edition, ISBN:978-0992461256.
7. JavaScript: The Definitive Guide - Master The World's Most-Used Programming Language, Seventh Edition
8. Java Script, D.Flanagan, O’Reilly, SPD.
9. Programming Typescript: Making Your JavaScript Applications Scale, Boris Cherny

E- Books / E- Learning References :

1. Learning Amazon Web Services AWS - A Hands-on Guide to the Fundamentals of AWS Cloud Author: Mark Wilkins.
2. https://www.meanacademy.in/web-technologies
3. https://www.meanacademy.in/angular
4. https://www.meanacademy.in/ mongodb
5. https://www.meanacademy.in/ nodejs
6. https://www.meanacademy.in/ aws
7. https://www.w3schools.com/Css
8. https://www.javatpoint.com/angularjs-tutorial
9. https://www.tutorialspoint.com/reactjs/index.htm
10. https://www.tutorialspoint.com/web_development_tutorials.htm
11. https://www.tutorialspoint.com/angular_material/index.htm
12. https://www.javaguides.net/2020/07/angular-10-example-tutorial.html
13. https://www.javatpoint.com/reactjs-tutorial
14. https://www.tutorialspoint.com/jquery_mobile/index.htm
15. https://www.tutorialspoint.com/nodejs/index.htm
16. https://www.tutorialspoint.com/expressjs/index.htm
17. https://www.tutorialspoint.com/mongodb/index.htm
18. https://www.tutorialspoint.com/mongodb/mongodb_tutorial.pdf
19. https://www.tutorialspoint.com/ajax/index.htm.
20. https://www.udemy.com/ajax/online-course.

Savitribai Phule Pune University, Pune

Third Year Information Technology (2019 Course)

314458: Laboratory Practice-II (Web Application Development)

Teaching Scheme:	Credit Scheme:	Examination Scheme:
Practical (PR) : 4 hrs/week	02 Credit	PR : 25 Marks TW : 50 Marks

HOME

Prerequisites: Programming languages C++, Java

Course Objectives:

1. To understand basic concepts of web programming and scripting languages.
2. To learn Version Control Environment.
3. To learn front end technologies and back end technologies.
4. To understand mobile web development.
5. To comprehend web application deployment.

Course Outcomes:

On completion of the course, students will be able to–

CO1: Develop Static and Dynamic responsive website using technologies HTML, CSS, Bootstrapand AJAX.
CO2: Create Version Control Environment.
CO3: Develop an application using front end and backend technologies.
CO4: Develop mobile website using JQuery Mobile.
CO5: Deploy web application on cloud using AWS.

Guidelines for Instructor's Manual

Lab Assignments: Following is a list of suggested laboratory assignments for reference. Laboratory Instructors may design a suitable set of assignments for their respective courses at their level. Beyond curriculum assignments, the mini-project is also included as a part of laboratory work. The Inclusion of few optional assignments that are intricate and/or beyond the scope of curriculum will surely be the value addition for the students and it will satisfy the intellectuals within the group of the learners and will add to the perspective of the learners. For each laboratory assignment, it is essential for students to draw/write/generate flowchart, algorithm, test cases, mathematical model, Test data set and comparative/complexity analysis (as applicable).

Guidelines for Student's Lab Journal

Program codes with sample output of all performed assignments are to be submitted as softcopy. Use of DVD or similar media containing students programs maintained by Laboratory In-charge is highly encouraged. For reference one or two journals may be maintained with program prints in the Laboratory. As a conscious effort and little contribution towards Green IT and environment awareness, attaching printed papers as part of write-ups and program listing to journals may be avoided. Submission of journal/ term work in the form of softcopy is desirable and appreciated.

Guidelines for Lab /TW Assessment
Term work is continuous assessment that evaluates a student's progress throughout the semester. Term work assessment criteria specify the standards that must be met and the evidence that will be gathered to demonstrate the achievement of course outcomes. Categorical assessment criteria for the term work should establish unambiguous standards of achievement for each course outcome. They should describe what the learner is expected to perform in the laboratories or on the fields to show that the course outcomes have been achieved. It is recommended to conduct an internal monthly practical examination as part of continuous assessment.
Guidelines for Laboratory Conduction
Following is a list of suggested laboratory assignments for reference. Laboratory Instructors may design a suitable set of assignments for respective courses at their level. Beyond curriculum assignments and mini-project may be included as a part of laboratory work. The instructor may set multiple sets of assignments and distribute among batches of students. It is appreciated if the assignments are based on real world problems/applications. The Inclusion of few optional assignmentsthat are intricate and/or beyond the scope of curriculum will surely be the value addition for the students and it will satisfy the intellectuals within the group of the learners and will add to the perspective of the learners. For each laboratory assignment, it is essential for students to draw/write/generate flowchart, algorithm, test cases, mathematical model, Test data set and comparative/complexity analysis (as applicable). Batch size for practical and tutorials may be as per guidelines of authority.
Guidelines for Practical Examination
Students' work will be evaluated typically based on the criteria like attentiveness, proficiency in execution of the task, regularity, punctuality, use of referencing, accuracy of language, use of supporting evidence in drawing conclusions, quality of critical thinking and similar performance measuring criteria.
List of Laboratory Assignments
Group A-(WAD)
Assignment 1 **a.** Create a responsive web page which shows the ecommerce/college/exam admin dashboard with sidebar and statistics in cards using HTML, CSS and Bootstrap. **b.** Write a JavaScript Program to get the user registration data and push to array/local storage with AJAX POST method and data list in new page.

Assignment 2

a. Create version control account on GitHub and using Git commands to create repository and push your code to GitHub.

b. Create Docker Container Environment (NVIDEIA Docker or any other).

c. Create an Angular application which will do following actions: Register User, Login User, Show User Data on Profile Component

Assignment 3

a. Create a Node.JS Application which serves a static website.

b. Create four API using Node.JS, ExpressJS and MongoDB for CURD Operations on assignment 2.C.

Assignment 4

a. Create a simple Mobile Website using jQuery Mobile.

b. Deploy/Host Your web application on AWS VPC or AWS Elastic Beanstalk. Mini Project

Develop a web application using full stack development technologies in any of the following domains:

1. Social Media
2. ecommerce
3. Restaurant
4. Medical
5. Finance
6. Education
7. Any other

Reference Books:

1. Kogent Learning Solutions Inc, Web Technologies: HTML, JAVASCRIPT, PHP, JAVA, JSP, XML and AJAX, Blackbook, Dreamtech Press, Second Edition, ISBN: 9788177228496.
2. Raymond Camden, Andy Matthews, jQuery Mobile Web Development Essentials, Packt Publishing, Second Edition, 9781782167891.
3. Steven M. Schafer, “HTML, XHTML and CSS”, Wiley India Edition, Fourth Edition, 978- 81-265-1635-3
4. Dr.HirenJoshi, Web Technology and Application Development, DreamTech, First,ISBN:978-93-5004-088-1
5. Steven M. Schafer, “HTML, XHTML and CSS”, Wiley India Edition, Fourth Edition, 978- 81-265-1635-3
6. Ivan Bayross,”Web Enabled Commercial Application Development Using HTML, JavaScript, DHTML and PHP,BPB Publications,4th Edition,ISBN:978-8183330084.
7. Brain Fling, Mobile Design and Development, O'REILLY, First Edition, ISBN: 13:978-81- 8404-817-
8. Adam Bretz & Colin J Ihrig, Full Stack Javascript Development with MEAN, SPD, First Edition, ISBN:978-0992461256.

- Books / E- Learning References

1. https://www.meanacademy.in/web-technologies
2. https://www.meanacademy.in/angular
3. https://www.meanacademy.in/mongodb
4. https://www.meanacademy.in/nodejs
5. https://www.meanacademy.in/aws