

SAURASHTRA UNIVERSITY

RAJKOT – INDIA



Accredited Grade A by NAAC (CGPA 3.05)

CURRICULAM

FOR

M. Sc. (IT & CA)

(2 Years Full Time: 4 Semester Programme)

**MASTER OF SCIENCE
(Information Technology & Computer Application)**

(Semester 3 & 4)

Effective From June – 2023

M.Sc. (IT & CA)
Saurashtra University
Effective from June - 2023
M.Sc. (IT & CA) (Semester – 3)

SR. NO.	SUBJECT	No. of LECT./Lab. PER WEEK	CREDIT
1.	CS – 13 FLUTTER APP DEVELOPMENT	5	5
2.	CS – 14 NODE JS	5	5
3.	CS – 15 WEB DEVELOPMENT USING ANGULAR FRAMEWORK	5	5
4.	CS – 16 PRACTICAL - 1 (BASED ON CS-13)	5	5
5.	CS – 17 PRACTICAL-2 (BASED ON CS-14 and (CS-15 OR CS-16))	5	5
6.	CS – 18 PROJECT DEVELOPMENT (In House)	5	5
Total Credits of Semester – 3			30

Note:

1. Total marks of each **theory paper** are 100 (university examination of 70 marks + internal examination of 30 marks).
2. Total marks of each **practical and project-viva** paper are 100. No internal examination of marks in practical and project-viva papers.

CS-13: FLUTTER APP DEVELOPMENT

Objectives:

- To understand the basic concepts of Flutter and Dart programming language, including its history and development environment.
- To design and build UIs in Flutter, including stateful widgets and responsive design techniques.
- To manage application state in Flutter using various techniques, such as InheritedWidget and ScopedModel.
- To integrate networking and persistence into their Flutter apps, including working with APIs and local storage.
- To understand advanced Flutter topics such as animations, internationalisation, and platform-specific integration.

Pre-Requisites: Basic knowledge of Programming, OOPs Concepts, Knowledge of Native Android Development

Sr. No	Topics	Details	Weightage in %	Approx Lectures
1	Introduction to Flutter and Dart	<ul style="list-style-type: none"> • Overview of Flutter and Dart • Overview of the Flutter architecture and how it works • Setting up the development environment • Dart syntax and data types • Basic Flutter widgets and layout • Basic Flutter widget properties and methods • Dart libraries and packages • Control flow and loops in Dart 	20	12
2	Building User Interfaces	<ul style="list-style-type: none"> • Stateful vs. Stateless widgets • Layout and widgets hierarchy • Navigation and routing • Responsive design and media queries • Advanced Flutter widgets (e.g., SliverAppBar, AnimatedContainer) • Custom widget creation in Flutter • Debugging UI issues in Flutter • Advanced layout techniques (e.g., Flexbox, GridView) 	20	12
3	Managing App State	<ul style="list-style-type: none"> • State management in Flutter • InheritedWidget and InheritedModel • ScopedModel and Provider • BLoC pattern for state management • Stream-based state management with 	20	12

M.Sc. (IT & CA)
Saurashtra University
Effective from June - 2023

		<ul style="list-style-type: none"> RxDart • Redux architecture for Flutter • Firebase integration for state management • Using the Flutter DevTools for debugging 		
4	Networking and Persistence	<ul style="list-style-type: none"> • RESTful APIs and HTTP requests • JSON serialization and deserialization • SQLite and local storage • Shared preferences and secure storage • WebSockets for real-time communication in Flutter • Firebase integration for data storage • Caching data in Flutter • Using third-party libraries for networking and data storage (e.g., Dio, Hive) 	20	12
5	Animation, Integration, Testing, Debugging & Accessibility	<ul style="list-style-type: none"> • Animations and motion • Advanced animation techniques (e.g., Flare, Lottie) • Internationalisation and localization • Native platform integration • Push notifications in Flutter (Firebase) • Integration with other native features (e.g., camera, location) • Testing and debugging • Accessibility in Flutter apps 	20	12
		Total	100	60

References Books / URL

1. Flutter in Action, written by Eric Windmill, January 2020, Manning Shelter Island, ISBN 9781617296147
2. Dart Programming for Flutter, written by Carmine Zaccagnino, Feb-2020, Publisher: Pragmatic Bookshelf, ISBN: 9781680506952
3. Flutter Cookbook: Over 100 Proven techniques and Solutions for Development with Flutter 2.2 and Dart, Simone Alessandria, Brian Kayfitz, 2021, Packt Publishing, ISBN 978-1838823382
4. Learning Dart, 2nd Edition, by Ivo Balbaert, Dzenan Ridjanovic, Packt Publishing, ISBN 10: 1785287621
5. Flutter Complete Reference: Create beautiful, fast and native apps for any device, Alberto Miola, Sep-2020
6. <https://fluttercompleterefrence.com/>

7. <https://flutter.dev/>
8. <https://developers.google.com/learn/pathways/intro-to-flutter>

Course Outcome:

After completion of the course students will be able:

- Able to understand and Implement the basic concepts of Flutter and Dart programming language, including its history and development environment.
- Able to design and build UIs in Flutter, including stateful widgets and responsive design techniques.
- Able to manage application state in Flutter using various techniques, such as InheritedWidget and ScopedModel.
- Able to integrate networking and persistence into their Flutter apps, including working with APIs and local storage.
- Able to understand advanced Flutter topics such as animations, internationalisation, and platform-specific integration.

M.Sc. (IT & CA)
Saurashtra University
Effective from June - 2023

CS – 14: NODE JS				
Objectives:				
<ul style="list-style-type: none"> ▪ Understand the JavaScript and technical concepts behind Node JS ▪ Structure a Node application in modules ▪ Understand and use the Event Emitter ▪ Build a Web Server in Node and understand how it really works ▪ Use npm and manage node packages ▪ Build a web application and API more easily using Express ▪ Understand how to Connect to database in Node 				
Pre-Requisites: Basic Knowledge of JavaScript and OOPS				
Sr. No	Topics	Details	Weightage in %	Approx Lectures
1	Introduction, Set up Development Environment, Other JavaScript Based Technologies	<ul style="list-style-type: none"> • Features and advantages of Node JS • Traditional Web Server Model • Node.js Process Model, • Asynchronous programming with Node.js • Types of applications that can be developed using Node.js • Install Node.js on Windows • working in REPL • Node JS Console • Creating a Node File with JavaScript • Accessing a Node.js File Through the Command Line Interface • Using Node.js in IDE • Node.js vs JavaScript • Node.js vs AJAX • Node.js vs JQuery • Node.js vs Angular JS 	20	12
2	Node.js Basic, Node.js Modules, Node Package Manager (NPM)	<ul style="list-style-type: none"> • Primitive Types • Object Literal, Functions, Buffer, Access Global Scope • Module, Module Types: Core Modules, Local Modules, Third Party Modules, Module Exports. • Using Modules in a Node.js File • Using the Built in HTTP, URL, Query String Module • Creating a Custom Module 	20	12

M.Sc. (IT & CA)
Saurashtra University
Effective from June - 2023

		<ul style="list-style-type: none"> • NPM, Installing Packages Locally • Adding dependency in package.json • Installing packages globally • Updating packages 		
3	Creating Web Server, File System, Debugging Node.js Application	<ul style="list-style-type: none"> • Handling HTTP requests • Sending requests • Reading, Writing a File • Writing a file asynchronously • Opening a file • deleting a file • Other IO Operations: Append, Rename, Truncate • File System Module with URL Module Create, Read, Remove a Directory 	20	12
4	Event, Database Connectivity	<ul style="list-style-type: none"> • EventEmitter class • Methods and Events of EvenEmitter Class • Returning event emitter • Extend EventEmitter Class • Passing Arguments and 'this' to listeners • Asynchronous and Synchronous call • Handle Events only Once, Error Events • Connection string for database connectivity, • Configuring, Working with insert, select command, Updating records, Deleting records, Drop tables, Ordered Result Set 	20	12
5	Express and Node.js	<ul style="list-style-type: none"> • Introduction to Express Framework • Express Server Request-Response Routes • Route Parameters • Multiple Route Callback/Handler Functions • Methods of Response Object • Chaining Route Handlers • Send Static Files • Accept User Input • File Upload with Express • Manage Cookies • Send file as a response • Templates and Express. 	20	12
		Total	100	60

References Books
<ol style="list-style-type: none">1. Dhruvi Shah, "Node.JS Guidebook", BPB Publications, 2018.2. Sebastian Springer, Node.js: The Comprehensive Guide (Grayscale Indian Edition) Paperback - Shroff/Rheinwerk; First edition, 20223. https://nodejs.org/en/docs/

Course Outcome:

After completion of the course students will be able:

- Understand Node JS and REPL terminal.
- Experiment with Node JS Modules and Node Package Manager.
- Develop applications to handle events in Node JS
- Make use of Web Server to manage database.
- Demonstrate Express Framework

CS – 15: WEB DEVELOPMENT USING ANGULAR FRAMEWORK

Objectives:

- Understand model view framework for building applications.
- Create modules for binding the application.
- Understand dependency injection for implementing services.
- Create and establish routes redirects and navigation.
- Validate forms for the submission of data.

Pre-Requisites: Basic Knowledge of HTML, JavaScript and TypeScript

Sr. No	Topics	Details	Weightage in %	Approx Lectures
1	Introduction of Angular, Set up Development Environment, Basic of Angular	<ul style="list-style-type: none"> • Introduction to Angular • AngularJS vs Angular • MVC Framework • Component Based Model • Setting Up Angular • Installation of Node and NPM • Angular CLI • Creating and Running Project • Dependencies • App Component • Anatomy of Component • Creating Components 	20	12
2	Data Binding in Angular	<ul style="list-style-type: none"> • Introduction to Data Binding • Types of Binding • Property Binding • Property Binding vs String Interpolation • Event Binding • Binding Data from Component • Async template Interpolation • Two-Way Binding • Forms Module and Two Way Binding • Understanding Directives • Looping with ngFor 	20	12

M.Sc. (IT & CA)
Saurashtra University
Effective from June - 2023

		<ul style="list-style-type: none"> • Condition with ngif, • Passing inputs and variables to Components • ngModel for 2-way binding • ngOnInit • Styling with components • Creating multiple modules 		
3	Dependency Injection and service in Angular	<ul style="list-style-type: none"> • Understanding Dependency Injection (DI) • Services • Creating a Service • Injecting the service into components • Understanding Dependency Hierarchical Injector • Injecting a Service into other services • Service Injection Context • Rest Calls with HttpClient • Building Angular Project 	20	12
4	Routing & Wrap Up	<ul style="list-style-type: none"> • Understanding the need of a Router • Setting Up and implementing Routes • Navigating to Router Links • Understanding Router Paths • Styling Active Router Links • Understanding Navigation Paths • Styling Router Links • Navigating Dynamically • Using Relative Paths • Passing Parameters to Routes and fetching route parameters • Fetching route parameters in a Reactive Way • Passing query parameters and fragments • Understanding Nested Routes • Redirecting and Wildcard routes • Wrap Up 	20	12
5	Form Handling and Even Handling	<ul style="list-style-type: none"> • Introduction to Form Handling • Form Validation • ng-minlength • ngmaxlength • ng-pattern • ng-required • Submitting Forms • Event Handling with Forms. 	20	12
		Total	100	60

References Books

- | |
|--|
| <ol style="list-style-type: none">1. Angular 6 by Example: Get up and running with Angular by building modern real-world web apps, 3rd Edition, by Chandermani Arora.2. Pro Angular 6, Apress, by Adam Freeman3. Angular JS by Green, Orielly4. Professional AngularJS (WROX), by Valeri Karpov |
|--|

Course Outcome:

After completion of the course students will be able:

- Create Angular component using angular dependencies.
- Apply data binding objects for implementing modules.
- Create service and retrieve rest call data.
- Understand routes and their configuration in angular.
- Implement form handling with event driven apps.

M.Sc. (IT & CA)
Saurashtra University
Effective from June - 2023

CS – 16: PRACTICAL - 1 (BASED ON CS-13)	
Topics	Marks
FLUTTER APP DEVELOPMENT	100

CS – 17: PRACTICAL - 2 (BASED ON CS-14 and (CS-15 OR CS-16))	
Topics	Marks
<ul style="list-style-type: none">• NODE JS• WEB DEVELOPMENT USING ANGULAR FRAMEWORK OR• APPLICATION DEVELOPMENT USING ASP.NET	100

Note:

- Practical examination may be arranged before or after theory exam.

CS – 18: PROJECT DEVELOPMENT (In House)	Marks: 100
Project must be developed in the computer laboratory of concern institute under the supervision of faculties of concern institute on any subject of current semester. <u>(At the time of Project-Viva examination student must show Project Report along with all the Workouts in workbook, implementation of project in SDLC, Documentation, Program codes and project in running mode)</u>	

Note:

- Project must be submitted before two weeks of commencement of theory exam.
- Project viva examination may be arranged before or after theory exam.
- During the project viva examination project must be run.