SAURASHTRA UNIVERSITY

RAJKOT – INDIA

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 – 2017

M.Sc. (IT & CA) (Semester – 3)

SR. NO.	COURSE	No. of LECT./Lab. PER WEEK	CREDIT
1.	**CS – 13** HYBRID MOBILE APPLICATIONS DEVELOPMENT USING WEB TECHNOLOGIES	5	5
2.	**CS – 14** WEB APPLICATION DEVELOPMENT USING DJANGO	5	5
3.	**CS – 15** PROGRAMMING WITH R FOR DATA SCIENCE	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)	5	5
6.	**CS – 18** PROJECT DEVELOPMENT (In House)	5	5
Total Credits of Semester – 3			30

CS-13 : Hybrid Mobile Applications Development Using Web Technologies

Objective:
- Focuses on developing multiplatform mobile applications using the Web skills (HTML5, CSS and Javascript).
- Understand AngularJS basic and advanced in depth concepts.
- Using the Cordova hybrid application framework to develop and target multiple mobile platforms with a single codebase.
- Using Ionic framework, one of fastest growing mobile application frameworks, that is built with mobile-optimized HTML5 and CSS based components and AngularJS.
- Understand NodeJS concepts.
- Publish mobile app on play store and app store.
- Understand UI development with Ionic and then using Cordova's modules to access the native mobile platform's capabilities from Javascript.

Pre-Requisites:
- Basic Programming Knowledge
- Basic Knowledge of HTML, CSS and Java Script
- Good Knowledge of Bootstrap
- Familiarity with AngularJS.

Sr. No	Topic	Details
1	**Introduction to Hybrid application, development platforms**	- What is hybrid application? - Need of hybrid application development - Tool and platforms in used for development of hybrid mobile application development ○ Phonegap-cordova ○ Ionic ○ Mobile angular UI - Step by step installation of coredova using git and npm - Introduction to HTML 5 and HTML 5 APIs ○ Forms validation ○ Audio video tags ○ Data storage APIs ▪ Local storage ▪ Web sql ▪ IndexedDB\ - Introduction to CSS, Sscss, less - Using bootstrap.css with mobile application development
2	**Java Script for Mobile Application Development**	- Introduction to Java Script - Variables, Scopes and functions in Java Script - What is jquery? - Forms, data validation and storage using jquery ○ Storage on client side(HTML 5 storage APIs) ○ Sending data over server side (may serverside be PHP or NodeJs) - What is angularjs? - Role of angularjs in platforms like mobile angular UI and

		Iconic
		• $scope and $rootScope
		• Config() and Run()
		• Directives in angularjs
		○ Ng-model ,Ng-bind, Ng-app, Ng-click, Ng-show/ng-hide, Ng-init, Ng-submit, Ng-repear, User-define dierctives
		• Filters in angularjs, Angular forms, Angular validation, Angular module, angular controller, angular factory, service
		• ui-router (restful application development)
		• $state, $statParms, $statProvider.stat()
		• MVC architecture of angularjs
		• Implementation of model (FACTORY/SERVICE), controller and view for data handling
		• Development a TO-DO, task application using angularjs
3	**Iconic – 1**	• Introduction to iconic platform for hybrid mobile application development
		• Step by step installation of iconic
		• Command line interface handling of iconic-1
		• Creating project in iconic (CLI APPROACH)
		• Component of iconic-1
		○ Colors, header, button, list, card, forms, checkgbox, radiobuttons, range, select (drop down), tabs, grid
		• Iconic java script components
		○ Action sheet, backdrop, content, forms, model, popover, popup, SideMenu, SlideBox
		• Platform management in iconic-1
		• Plugins for iconic-1
		• ngCordova plugins
		• stateful approach of developing iconic applications ($stateProvider.state())
		○ passing data into the state by URL
		○ States hierarchy
		• Injection of controllers and factories in modules
		• Icon and Splash Screen for iconic applications
		• Implementation of MVC architecture (exactly as MVC of angularJS)
		• http request and promises in factory()
		• populating data into view from controller
		• Themes in iconic
4	**Interaction with server side PHP**	• Database connection to MySQL
		• Associative arrays and array handling in PHP
		○ Array_push(), array_pop(), array_search(),

		in_array()
		• Reading JSON as input
		o file_get_contents("php://input");
		o json_encode() and json_decode()
		• data communication and interaction with client side using JSON
		• CRUD operation with PHP and MySQL
		o C=create (INSERT QUERY), R=read (SELECT QUERY), u = update (UPDATE QUERY), D=delete(DELETE QUERY)
		• Introduction to Nodejs
		• Architecture of Nodejs
		• Step by step installation of Nodejs
		• Introduction to express-Nodejs
		• Create a server and listen to port in Nodejs
5	**Accessing Native Services using Iconic and Application Signing and Development**	• Iconic-cordova integration, iconic-camera, iconic-native audio, iconic-media, iconic-InApp browser
		• Introduction to git
		• Basic commands in git
		o Push, pull, commit, rollback, status, init, branch
		• Git branches
		• Git push & pull operations
		• Significance and importance of git in development of applications
		• Maintaining version of applications using git
		• Android
		o Signing application (keystore)
		o Publishing application on play store
		• IOS
		• Build and publication application in App store

References Books:

- Mobile App Development with Ionic 2 Cross-Platform Apps with Ionic, Angular, and Cordova By Chris Griffith Publisher: O'Reilly Media Final Release Date: April 2017
- Learning Ionic – Arvind Ravulavaru – PACKT Publishing, July – 2015
- Ionic in Action: Hybrid Mobile Apps with Ionic and AngularJS - Jeremy Wilken, Manning Publications, 2015
- Learning PHP, MySQL & JavaScript 4e (Learning Php, Mysql, Javascript, Css & Html5)
- AngularJS - O'Reilly Media By Brad Green, Shyam Seshadri
- Getting Started with Ionic By: Rahat Khanna - Packt Publishing

Useful Links:

https://www.javatpoint.com/nodejs-tutorial

https://www.tutorialspoint.com/html5/index.htm

https://www.tutorialspoint.com/ionic

https://www.w3schools.com/angular/

CS – 14 : Web Application Development using Django

Objective:
- Understand how to learn a web development framework.
- Understand how to use Python and Django to develop modern web applications.
- Gain functional knowledge of Python, Databases and the Django framework.
- Understand current web development best practices.
- Build and deploy a Python Django web application that incorporates a database.

Pre-Requisites:
- Basic programming knowledge.
- Object Oriented Programming knowledge.
- Knowledge Python would be desired, not mandatory.

Sr. No	Topic	Details
1	**Introduction to Python and Python Syntax, Language Components / Collections & Functions,**	A Brief History of Python, Strengths and Weaknesses, Python Versions. Installing Python, Environment Variables, and Executing Python from the Command Line, IDLE, Editing Python Files, Getting Help, Dynamic Types, Python Reserved Words, Naming Conventions, Basic Syntax, Comments, String Values, String Operations, The format Method, String Slices, String Operators, Numeric Data Types, Conversions, Simple Input and Output, The print Function. Control Flow and Syntax, Indenting, if Statement, Relational Operators, Logical Operators, True or False, Bit Wise Operators. The while Loop, break and continue, The for Loop, Lists, Tuples, Sets, Dictionaries, Sorting Dictionaries, Copying Collections, Summary, Defining Your Own Functions, Parameters, Function Documentation, Keyword and Optional Parameters, Passing Collections to a Function.
2	**Introduction to Web framework and DJango DJango Template System**	HTTP Client-Server Request – Response, concept of web framework and web application. Introduction to Django, MVC Design Pattern, Django installation, setting up database, starting project. Django project architecture, Understanding manage.py, Understanding settings.py, Understanding __init__.py and wsgi.py, Understanding urls.py and Python regular expression, Understanding admin.py, Understanding models.py, Understanding views.py , Running Django development server Template system basics, Using template system, basic

		template tags and filters, using templates in views, template loading.
3	**Interaction with Database**	Configuring database, defining model, basic data access, inserting and updating data, selecting objects, deleting objects.
4	**Django Admin Site & Forms, Views and URLConfs**	Activating the Admin interface, Creating super user for Admin site, Using the Admin site, Using Admin site, django.contrib package. Form basics, GET and POST methods , Form validation, Rendering forms , ModelForm, Understanding the view layer, Requesting a web page via URL, Rendering web page via view function, Render HTTPResponse to templates, Understanding context data and Python dictionary type.
5	**Session and Cookies & Testing and Deploying web application**	Cookies: Getting and Setting Cookies. Session: Django's session framework: enabling sessions, using session in views, session outside views. Testing Django, Python's unittest2 library, Deploying Django application on GitHub / Amazon Web Service.

References Books:
▪ John V Guttag. "Introduction to Computation and Programming Using Python", Prentice Hall of India ▪ Learning Website Development using DJano – Ayman Hourieh – PACKT Publishing ▪ Pro DJango – Marty Alchin - APress ▪ The Definitive Guide to Djano: Web Development done Right – Adrian Holovaty, Jacob K. Moss.

CS-15 : Programming with R for Data Science

Objective:
- The main objective of this syllabus is to ensure the working aspects of R-Programming.
- Here, Students will be able to learn R programming with various level of strategic inputs such as Vectors, Arrays, Matrices, Strings and Factors etc.
- The course also covers the understanding the aspects of Packages and at last Visualize the data in the form of graph in various ways.

Pre-Requisites:
- A basic understanding of any of the computer programming language will help in understand the R programming concepts.
- Relevant knowledge of Linux OS needed if working in Open source OS for various IDE's

Sr. No	Topic	Details
1	**Introduction to Data Analysis and Fundamentals of R**	- Overview of Data Analytics, Need of Data Analytics - Classification of Data: Structured, Semi-Structured, Unstructured, - Characteristics of Data, Applications of Data Analytics. - Setup with R Studio - R Commands, Variables, Data Types. - Vectors - Sequences, Lengths, Names, Indexing vectors, Vector Recycling and Repetition - Matrices and Arrays - Creating Arrays and Matrices, - Row, Columns and Dimensions - Row, Column and Dimension names, Array Arithmetic - Lists - Creating Lists, Atomic and Recursive Variables, List Dimensions and Arithmetic - Indexing Lists, Converting Between Vectors and Lists - Combining Lists, NULL. Pair lists - Data Input - Data Input from Keyboard, Input from files(CSV), input from files using scan, Reading data from a file using readLines, Masking Input and output formats, Checking Files from cmd. - Data Frames - Creating Data Frames, Indexing Data Frames, Basic Data Frames Manipulation
2	**Environment, Functions, String, Factors, Flow Control and Loops**	- Environments - Functions – Creating and calling Functions, Passing functions to and from other functions, Variable scope, Commands to Functions, Functions and Functional Programming, Function Objects and Function Calls, Debugging, Interactive Tracing and Editing, Conditions: Errors and Warnings, Testing R Software. - Strings

		o Constructing and Printing Strings, Formatting Numbers, Special Characters, Changing Case, Extracting Substrings Splitting Strings, File Paths • Factors o Creating Factors, Changing Factor Levels, Dropping Factor Levels, Ordered Factors, Converting Continuous Variables to Categorical, Converting Categorical Variables to continuous, Generating Factor Levels, Combining Factor Levels • Flow Control and Loops o Flow Control – if and else, Vectorized if, Multiple selections o Loops – repeat, while, for, lapply, sapply, • Advance Loops – Replication, Looping over Lists, Looping Over Arrays, Multiple Inputs, Split-Apply-Combine, the plyr package.
3	**Creating Packages and working with date & time**	• Packages o Loading Packages – The search path, Libraries and Installed packages o Installing Packages o Maintaining Packages • Dates and Time
4	**Data Visualization and Graphics**	• Reading and getting data into R (External Data): Using CSV files, XML files, Web Data, JSON files, Databases, Excel files. • Working with R Charts and Graphs: Histograms, Boxplots, Bar Charts, Line Graphs, Scatterplots, Pie Charts
5	**Analytics Using R**	• Big Data analytics using R. • Business Foundation Analytics Using R • Data Flow and Management for Business Operations and Problem Solving • Typical Analytical Process Flow • Data Collections Method • Data Summarization and Presentation • Managing Data using Analytics Tools (R) • Data Manipulation and Report Generation Using R

References Books:
▪ Data Manipulation with R by Phil Spector ISBN 978-0-387-74731-6 ▪ Learning R by Richard cotton • *Reference Link: https://books.google.co.in/books?id=7dyzAAAAQBAJ&printsec=frontcover#v=onepage&q&f=false* ▪ The R Book by Michael J. Crawley • *Reference Link: https://books.google.co.in/books?id=XYDl0mlH-moC&printsec=frontcover&dq=r+programming&hl=en&sa=X&redir_esc=y#v=onepage&q=r%20programming&f=false* ▪ Software for Data Analysis Programming with R. by John M. Chambers • *Reference Link: http://www.e-reading.club/bookreader.php/137398/Software_for_Data_Analysis_-_Programming_with_R.pdf*

CS – 16: PRACTICAL - 1 (BASED ON CS-13)	
Topics	**Marks**
Hybrid Mobile Applications Development Using Web Technologies	**100**

CS – 17: PRACTICAL - 2 (BASED ON CS-14 and CS-15)	
Topics	**Marks**
• WEB APPLICATION DEVELOPMENT USING DJANGO • PROGRAMMING WITH R FOR DATA SCIENCE	**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. **(At the time of Project-Viva examination student must show Project Report (In Hard Copy) along with all the Workouts in workbook, implementation of project in SDLC, Documentation, Program codes and project in running mode)**

Note :
• Project must be submitted before two week 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.

M.Sc. (IT & CA) (Semester – 4)

CS – 19: INDUSTRIAL PROJECT DEVELOPMENT CREDIT - 30	**Marks: 300**

Project must be developed at industrial organization. **(At the time of Project-Viva examination student must show Project Report (In Hard Copy) along with all the Workouts in workbook, implementation of project in SDLC, Documentation, Program codes (Optional) and project in running mode).**

Guidelines:
(1) Institute/College/Department has to make arrangement for the students for project development in various software development organizations in industry.
(2) Project work must be developed at the industrial organization, not at the paid or free project training institute.
(3) Internal guide from institute and external guide from Industry must be allocated for supervision
(4) Coding standards should be followed meticulously. At the minimum, the code should be self-documented, modular, and should use the meaningful naming convention.
(5) The documentation should include a chapter on "Learning during Project Work", i.e. "Experience of Journey during Project Duration".

SrNo	Evaluation Criteria	Marks
1	EXPLANATION OF CODE	75
2	EXPLANTION OF ANALYSIS AND DESIGN	75
3	DOCUMENTATION	75
4	PRESENTATION	75
	Total Marks	300