

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 – 2017

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M.Sc. (IT & CA) (Semester – 3)

| SR. NO. | COURSE | No. of LECT./Lab. PER WEEK | CREDIT |
|--------------------------------------|--|-----------------------------------|---------------|
| 1. | CS – 13 DEVELOPING CROSS PLATFORM MOBILE APPLICATION USING XAMARIN | 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 |

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| CS-13 : Developing Cross-Platform Mobile Applications Using Xamarin | | |
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| Objective: | | |
| <ul style="list-style-type: none"> ▪ Xamarin is so popular with cross platform native applications development. ▪ Build native mobile apps for iOS and Android platforms and take your app development strategy to the next level. ▪ Write cross platform UI code in a simple and concise manner and run the applications. ▪ Learn about XAML, data binding and controls, and how to use them effectively within your Xamarin.Forms applications. ▪ Learn the common data access patterns for Xamarin's iOS and Android platforms. | | |
| Pre-Requisites: | | |
| <ul style="list-style-type: none"> ▪ Good Understanding of C#/.NET Programming Concepts. ▪ Good Understanding of OOPS Concepts. ▪ Basic Knowledge of OS X usage and navigation would be desired, not mandatory. | | |
| Sr. No | Topic | Details |
| 1 | Starting with Xamarin Studio & Xamarin.iOS & Xamarin.Android | <ul style="list-style-type: none"> • Xamarin Studio overview • Installing Xamarin Forms • Beginning Xamarin Trial Development • Licensing for compiling and testing Xamarin Forms Apps • Visual Studio plug-in for Building Apps with Forms • iOS Application Structure • Android Application Structure • Native Platform features and Architectures • iOS and Android Life Cycle • How do Xamarin.iOS and Xamarin.Android Interact and Compile to Native Environments. • Calling native functions and libraries. • Compiling and Running Native Builds. • How do these Native SDKs differ from Xamarin Forms. |
| 2 | Controls & Web Service | <ul style="list-style-type: none"> • Basic Controls – Editor, Images, Labels • TableView Control and ListView Control • Custom Controls For each platform • Accessing Native Controls via Dependency Service and Dependency Injection • Web View Control • Accessing Web Services on each platform |
| 3 | Platform Tweaks & Cross Platform Options. | <ul style="list-style-type: none"> • Accessing Native Features of platforms • Bluetooth and Wi-Fi Communications • Using Compiled Libraries (Subject to Source, |

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| | | <p>target platform and format of library).</p> <ul style="list-style-type: none"> • Using Dependency Services for Platform Specific Libraries. • Shared Projects & PCL Solution |
| 4 | Xamarin Forms, Database Access & Accessing Application Resources | <ul style="list-style-type: none"> • Introduction to Forms • Xamarin Forms XAML basics • Building Controls with XAML and C# • Data Binding • Working with Controls • Controlling Styles and Custom Controls • The Native Directory Structures • Using SQLite with different platforms in PCL • Using SQLite with different platforms in Shared Project • Accessing Application Folders and Shared Folders • Adapting the Code to Platform specific Folder structure • Accessing resources from Shared resources • Accessing resources from Android Project • Accessing resources from iOS Project • Accessing resources from Shared Code Project |
| 5 | Creating, Testing & Deploying Xamarin Application. | <ul style="list-style-type: none"> • Creating ToDo Task Application with View a list of tasks, Add, edit and delete tasks, Set a task's status to done • Creating Money Conversion Application • Creating Play Some Tunes Application. • What are the basic steps for deploying an application to Google Play & iOS AppStore? • Application packaging for each platform (what is contained in the app, what is the extension, etc.) |

References Books:

- Creating Mobile Apps with Xamarin.Forms Cross-platform C# programming for iOS, Android, and Window by Charles Petzold published by Microsoft Press ISBN: 978-1-5093-0297-0
- Xamarin Cross-platform Application Development By Jonathan Peppers published by Packt Publishing Ltd. ISBN 139781849698467

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| CS – 14 : Web Application Development using Django | | |
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| Objective: | | |
| <ul style="list-style-type: none"> ▪ 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: | | |
| <ul style="list-style-type: none"> ▪ 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, | <p>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.</p> <p>Control Flow and Syntax, Indenting, if Statement, Relational Operators, Logical Operators, True or False, Bit Wise Operators.</p> <p>The while Loop, break and continue, The for Loop, Lists, Tuples, Sets, Dictionaries, Sorting Dictionaries, Copying Collections, Summary,</p> <p>Defining Your Own Functions, Parameters, Function Documentation, Keyword and Optional Parameters, Passing Collections to a Function.</p> |
| 2 | Introduction to Web framework and Django Django Template System | <p>HTTP Client-Server Request – Response, concept of web framework and web application.</p> <p>Introduction to Django, MVC Design Pattern, Django installation, setting up database, starting project.</p> <p>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</p> <p>Template system basics, Using template system, basic</p> |

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| | | 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.

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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 | <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> ○ Sequences, Lengths, Names, Indexing vectors, Vector Recycling and Repetition • Matrices and Arrays <ul style="list-style-type: none"> ○ Creating Arrays and Matrices, ○ Row, Columns and Dimensions ○ Row, Column and Dimension names, Array Arithmetic • Lists <ul style="list-style-type: none"> ○ Creating Lists, Atomic and Recursive Variables, List Dimensions and Arithmetic ○ Indexing Lists, Converting Between Vectors and Lists ○ Combining Lists, NULL. Pair lists • Data Input <ul style="list-style-type: none"> ○ 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 <ul style="list-style-type: none"> ○ Creating Data Frames, Indexing Data Frames, Basic Data Frames Manipulation |
| 2 | Environment, Functions, String, Factors, Flow Control and Loops | <ul style="list-style-type: none"> • 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 |

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| | | <ul style="list-style-type: none"> ○ Constructing and Printing Strings, Formatting Numbers, Special Characters, Changing Case, Extracting Substrings Splitting Strings, File Paths ● Factors <ul style="list-style-type: none"> ○ 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 <ul style="list-style-type: none"> ○ Flow Control – if and else, Vectorized if, Multiple selections ○ 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 | <ul style="list-style-type: none"> ● Packages <ul style="list-style-type: none"> ○ Loading Packages – The search path, Libraries and Installed packages ○ Installing Packages ○ Maintaining Packages ● Dates and Time |
| 4 | Data Visualization and Graphics | <ul style="list-style-type: none"> ● 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 | <ul style="list-style-type: none"> ● 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

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| CS – 16: PRACTICAL - 1 (BASED ON CS-13) | |
|---|------------|
| Topics | Marks |
| Developing Cross-Platform Mobile Applications Using Xamarin | 100 |

| CS – 17: PRACTICAL - 2 (BASED ON CS-14 and CS-15) | |
|--|------------|
| Topics | Marks |
| <ul style="list-style-type: none">• 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 |
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| <p>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 (In Hard Copy) along with all the Workouts in workbook, implementation of project in SDLC, Documentation, Program codes and project in running mode)</u></p> | |

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.

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| CS – 19: INDUSTRIAL PROJECT DEVELOPMENT | CREDIT - 30 | Marks: 300 |
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| <p>Project must be developed at industrial organization. <u>(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).</u></p> |
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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 |