College of Computer, Science & Information Technology - Junagadh

AFFILIATED TO BHAKTA KAVI NARSINH MEHTA UNIVERSITY

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C C S I T

M.Sc.(IT & CA)

[Master of Science in Information Technology & Computer Application]

[Semester – III & IV]

(Effective From June – 2024)

Academic Year : 2025-26

http://www.

SYLLABUS PATTERN OF MASTER OF SCIENCE IN INFORMATION TECHNOLOGY

(SEMESTER-III)

Subject code	Subject Name	Credit	Int. Marks	Ext. Marks	Total Mark
CS-13	**Node JS**	5	30	70(14x5)	100
CS-14	**Application Development using Flutter**	5	30	70(14x5)	100
CS-15	**Programming with R for Data Science**	5	30	70(14x5)	100
CS-16	**Practical – 1 (Based on CS – 13)**	5	-	-	100
CS-17	**Practical – 2 (Based on CS – 14 & CS – 15)**	5	-	-	100
CS-18	**Project Development (In House)**	5	-	-	100
Total Credits		**30**	**Total Marks**		**600**

Structure of Theory Examination Paper – External
(for Master of Science in Information Technology)

Question Paper contains 5 Questions (each of 14 marks). Every Question will be asked from corresponding unit as specified in the syllabus of each course. (i.e. Question-1 is from Unit No. 1 and remaining questions from their corresponding Units).		
Every Question is divided in four parts like (a), (b), (c) and (d).		
Que-1(A)	Contains four objective type questions (not MCQ) like definition, reason, answer in one line, answer in one word etc., each of one marks and no internal option.	(4x1=4) 04 Marks
Que-1(B)	Contains two questions each of two marks and student will attempt any one out of two.	(1x2=2) 02 Marks
Que-1(C)	Contains two questions each of three marks and student will attempt any one out of two.	(1x3=3) 03 Marks
Que-1(D)	Contains two questions each of five marks and student will attempt any one out of two.	(1x5=5) 5 Marks
Total Marks		**14 Marks**
TOTAL MARKS : 70, TOTAL TIME : 2½ HOURS		

General Instructions:
1. Time duration of each theory paper will be of three hours.
2. Total marks of each theory paper will be 70 marks.
3. There will be five questions.
4. There will be internal option for all the questions(as shown in table above)
5. All questions are compulsory

Instructions to the candidates for Practical Examination :-
1. All the students have to remain present at the examination center 15 minutes before the scheduled time for examination.
2. Students have to carry with them certified journal, I – card, examination receipt, and other necessary requirements for examination.
3. Candidate should not leave the laboratory without the permission of examiner.
4. Use of calculator is allowed but the use of mobile phones is strictly prohibited.
5. The candidate has to leave the laboratory only after the submission of all the answer sheets of the exercises performed.

M.Sc.(IT & CA) Semester – III
CS-13 : Node JS

Course Objectives:
1. Understand the JavaScript and technical concepts behind Node JS
2. Structure a Node application in modules
3. Understand and use the Event Emitter
4. Build a Web Server in Node and understand how it really works
5. Use npm and manage node packages
6. Build a web application and API more easily using Express
7. Understand how to Connect to database in Node

Pre-Requisites:
1. Basic Knowledge of JavaScript and OOPS

Course Content

Unit No.	Syllabus	Teaching Hours
1	**Introduction to Node JS** • What is Node.js? • Different parts of Node.js • Features of Node.js • Install Node.js on Windows • Node.js First Example • Node.js vs JavaScript • Node.js vs AJAX • Node.js vs JQuery **Node.js Basics** • Primitive Types • Loose Typing • Object Literal • Functions • Buffer • Process object • Defaults to local • Access Global Scope	15

2	**Node.js Console/REPL**
	• Node.js Console
	  • console.log()
	  • console.error()
	  • console.warn()
	• Node.js REPL
	  • REPL Environment
	  • How to start REPL
	  • Node.js Simple expressions
	  • Using variable
	  • Node.js Multiline expressions
	  • Node.js Underscore Variable
	  • Node.js REPL Commands
	  • Node.js Exit REPL
	• Node.js Package Manager
	  • Installing Modules using npm
	  • Global vs Local Installation
	  • Uninstalling a Module
	  • Searching a Module
		15

3	**Node.js Module** • Node.js Module Types • Node.js Core Modules • Loading Core Modules • Node.js Local Module • Export Module in Node.js	15
4	**Node.js Web Server, File System, Debugging**	15

	Node.js	
	- 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	
5	**Event and Database Connectivity** - 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	15

Suggested Reading:

Reference Books: No.	Name/Author/Publication
1	Dhruti Shah, "Node.JS Guidebook", BPB Publications, 2018.
2	Sebastian Springer, Node.js: The Comprehensive Guide (Grayscale Indian Edition) Paperback - Shroff/Rheinwerk; First edition,2022
3	https://nodejs.org/en/docs/

Web site References:
1. https://www.tutorialsteacher.com/nodejs
2. https://www.javatpoint.com/nodejs-tutorial
3. https://www.tutorialspoint.com/nodejs/index.html

CS – 14 : Application Development using FLUTTER

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

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

Course Content

Unit No.	Syllabus	Teaching Hours
1	**Introduction to flutter** - Introduction - History of Flutter - Features of Flutter - Advantage of Flutter - Disadvantages of Flutter - Flutter Installation for windows - Flutter Architecture **Introduction to Dart Programming** - Data Type - Variables and Functions	15

		• Operators • Decision Making and Loops • Continue and Break • Final and Const Keyword • OOP Concepts	

2		**Flutter Basics**
		  • Flutter Widgets
		    • Types of Widget
		    • State Management Widget
		  • Flutter Scaffold
		    • **Constructor and Properties** of the Scaffold widget class
		  • Flutter Layouts
		  • Flutter Gestures system
		    • Gestures and pointers
		    • Gesture Detector
		  • Flutter State Management
		  • Flutter IDE
			15

3		**Flutter Container and Controls**
		  • Flutter Container
		  • Flutter Row and Column
		  • Flutter Text
		  • Flutter TextField
		  • Flutter Buttons
		  • Flutter Stack
		  • Flutter Forms
		  • Flutter Alert Dialogs
		  • Flutter Icons
		  • Flutter Images
		  • Flutter Card
		  • Flutter Tabbar
		  • Flutter Drawer
		  • Flutter Lists
		  • Flutter GridView
		  • Flutter Toast
		  • Flutter Checkbox
		  • Flutter Radio Button
		  • Flutter Progress Bar
		  • Flutter Snackbar
		  • Flutter Tooltip
		  • Flutter Slider
		  • Flutter Switch
		  • Flutter Charts
		  • Bottom Navigation Bar
		  • Flutter Themes
		  • Flutter Table
		  • Flutter Calendar
		  • Flutter Animation
			15

4		**Design & Animations**
		  • Customizing Fonts in Flutter
		  • Flutter - Skeleton Text
		  • Flutter - Themes
		  • Flutter - Lazy Loader
		  • Flutter - UI Orientation
		  • Flutter - Animation in Route Transition
		  • Flutter - Physics Simulation in Animation
		  • Flutter - Radial Hero Animation
		  • Flutter - Hinge Animation
		  • Flutter - Lottie Animation
			15

	Forms & Gestures	
	• Form Validation in Flutter • Designing a Form Submission Page in Flutter • Flutter - Gestures	
5	• Flutter - Read and Write Data on Firebase • Mail and SMS in Flutter • Gallery Access and Camera in Flutter • Camera Access in Flutter • SQLite and local storage • Shared preferences • Background local notifications in Flutter • HTTP GET Response in Flutter	15

Suggested Reading:

Reference Books: No.	Name/Author/Publication
1	Flutter in Action, written by Eric Windmill, January 2020, Manning Shelter
2	Dart Programming for Flutter, written by Carmine Zaccagnino, Feb-2020, Publisher: PragmaticBookshelf, 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, AlbertoMiola, Sep-2020

Web site References:
1. https://docs.flutter.dev/reference/tutorials
2. https://www.javatpoint.com/flutter
3. https://www.geeksforgeeks.org/flutter-tutorial/
4. https://www.tutorialspoint.com/flutter/index.html

CS-15 : Programming with R for Data Science

Course Objectives:
1. The main objective of this syllabus is to ensure the working aspects of R-Programming.
2. Here, Students will be able to learn R programming with various level of strategic inputs such as Vectors,Arrays, Matrices, Strings and Factors etc.
3. 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:
1. A basic understanding of any of the computer programming language will help in understand the Rprogramming concepts.
2. Relevant knowledge of Linux OS needed if working in Open source OS for various IDE's

Course Content

Unit No.	Syllabus	Teaching Hours

1	**Introduction to Data Analysis & 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
		15

	• 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 fileusing 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 • Constructing and Printing Strings, Formatting Numbers, Special Characters, Changing Case, Extracting Substrings Splitting Strings, File Paths • Factors • 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 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.	15

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
		15

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, PieCharts	15
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	15

Suggested Reading:

Reference Books: No.	Name/Author/Publication
1	Data Manipulation with R by Phil Spector ISBN 978-0-387-74731-6
2	Learning R by Richard cotton https://books.google.co.in/books?id=7dyzAAAAQBAJ&printsec=frontcov er#v=onepage&q &f=false
3	The R Book by Michael J. Crawley https://books.google.co.in/books?id=XYDl0mlHmoC&printsec=frontcover &dq=r+program ming&hl=en&sa=X&redir_esc=y#v=onepage&q=r%20pro gramming&f=false
4	Software for Data Analysis Programming with R. by John M. Chambers http://www.ereading.club/bookreader.php/137398/Software_for_Data_Analysis_Programmin g_with_R.pdf https://www.tutorialspoint.com/r/index.html

CS – 16 : Practical-1 (Based on CS–14)	
Topic	**Marks**
CS-14 : Application Development using FLUTTER • Each session is of 3 hours for the purpose of practical Examination. • Practical examination may be arranged before or after theory exam	**100**

CS – 17 : Practical-2 (Based on CS–13 & CS–15)	
Topic	**Marks**
CS-13 : NODE JS **CS-15 : Programming With R For Data Science** • Each session is of 3 hours for the purpose of practical Examination. • Practical examination may be arranged before or after theory exam	**100**

CS – 18 : Project Development(In House)	
Topic	**Marks**
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.	**100**

M.Sc.(IT & CA) Semester – IV

CS-19 : Industrial Project Development	
Topic	**Marks**
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).**	**300**

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".

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

Sr. No.	Evaluation Criteria	Marks
1	EXPLANATION OF CODE	75
2	EXPLANATION OF ANALYSIS AND DESIGN	75
3	DOCUMENTATION	75
4	PRESENTATION	75
Total Project Marks		**300**

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Courses Offered

➢ B.Sc. – Bachelor of Science

➢ B.Sc.(IT) – Bachelor of Science in Information Tech.

➢ B.C.A. – Bachelor of Computer Application

➢ D.M.L.T. – Diploma in Medical Laboratory Technology

➢ M.Sc.(IT) – Master of Science in Information Technology

➢ M.Sc.(Micro.) – Master of Science in Microbiology

➢ M.Sc.(Chem.) – Master of Science in Chemistry

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