M.Sc. (IT & CA) (Semester – 2)

SR. NO.	SUBJECT	No. of LECT./Lab. PER WEEK	CREDIT
1.	**CS – 07** APPLICATOIN DEVELOPMENT USING ADVANCED ANDROID	**5**	**5**
2.	**CS – 08** REACT JS & EXPRESS JS	**5**	**5**
3.	**CS – 09** CLOUD COMPUTING WITH AWS	**5**	**5**
4.	**CS – 10** PRACTICAL - 1 (BASED ON CS-07)	**5**	**5**
5.	**CS – 11** PRACTICAL - 2 (BASED ON CS-08 and CS-09)	**5**	**5**
6.	**CS – 12** PROJECT DEVELOPMENT (In House)	**5**	**5**
Total Credits of Semester – 2			**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 – 07: APPLICATOIN DEVELOPMENT USING ADVANCED ANDROID

Objectives:

- To be able to develop mobile applications using advanced android api based on
- Data storage in external and internal memory and database
- To develop app that supports animation, multimedia, camera, sensor
- To develop app that supports Network, Bluetooth-Wi-Fi
- Developing web service and retrieving data using JSON & xml
- Packaging and distributing android app

Pre-Requisites: OOPS concepts, Programming in core java, Basic Android Programming.

Sr. No	Topics	Details	Weightage in %	Approx Lectures
1	**Basics of Android & UI Design**	• Core building blocks, Android manifest.xml file, Basic UI widgets, Activity, Layout, Intent, Fragments	**20**	**12**
	Working with view and adapter	• TextView, EditText, Spinner, DatePicker, TimePicker Dialogs, Material Design, TextInputLayout, Password Toggle, Button, ToggleButton, ImageButton, RadioButton, RadioGroup, Checkbox, AutoCompleteTextView, MultiAutoCompleteTextView, • Views: CardView, RecyclerView, ListView, GridView, ScrollView, WebView, SearchView, TabLayout, DynamicListView, ExpandedListView • Adapters: ArrayAdapter, Simple Cursor Adapter, Base Adapter, • Layout: ConstraintLayout, LinearLayout, TableLayout, FrameLayout, Relative Layout, Custom Layout		
2	**Data Storage, SQLite, Firebase, Content Provider & Notification**	• Shared Preferences • Android File System • Internal storage, External storage • SQLite : Storing data using SQLite, Querying SQLite database, insert-update-delete operations, Persistent database using SQLiteOpenHelper and creating a database • Integration with Realtime Firebase Database • CRUD Operation with Firebase Database	**20**	**12**
		• Accessing built in content providers like		

		Read Call Log, Read Contact, Read Images from Memory Card • Searching for content • Adding, changing, and removing content • Creating custom content provider • Sending & Receiving Broadcast • Notifying user, Notifying with status bar		
3	**Multimedia API**	• Wallpapaer, Live Wallpaper, • Audio – Recording audio, Playing audio • Video– Recording video, Playing video • Alarm Manager • Camera - Capturing pictures, configuring camera mode settings, camera parameters, zooming camera.	**20**	**12**
	Device Connectivity	• Bluetooth Tutorial –existence of Bluetooth, enable Bluetooth, discover devices, List Paired Devices, establishing connection between devices. • Working with WiFi		
	Working with Sensor	• Sensor API, • Working with different sensors :Motion Sensor, Position Sensor, Environmental Sensor, • Sensor Values, SensorManager class, Sensor Class, SensorEvent class, SensorEventListener interface, Compass Acceslerometer and Orientation Sensors • Reading sensor data, calibrating sensors, determining device orientation		
4	**Android Web Service**	• Introduction to web service, • Soap Vs Restful web service • Android Restful web service example with java servlet • Storing data into external database • Verifying data in android with external database	**20**	**12**
	JSON & XML Parsing	• XML Parsing SAX • XML Parsing DOM • XML Pull Parser • JSON Parsing • Integrating Social Networking using HTTP		
	WiFi & Bluetooth	• Monitoring and managing Internet connectivity • Managing active connections • Managing WiFi networks		

		• Controlling local Bluetooth device • Discovering and bonding with Bluetooth devices • Managing Bluetooth connections • Communicating with Bluetooth		
5	**Location Based Services and Google Maps**	• Location Based Services - Finding current location and listening for changes in location, Proximity alerts, Working with Google Maps • Showing google map in an Activity • Map Overlays • Itemized overlays • Geocoder • Displaying route on map	**20**	**12**
	Drawing, Animation and Graphics programing	• Drawing on screen – using canvas and paint • Working with bitmap, shapes • 2D Animation - Drawable, View, Property animation		
	Packaging, Deploying and distributing/ selling app	• Signing certificate and generating apk and Bundle • Distributing android app via Google Play • Obfuscating and optimizing with ProGuard		
		Total	**100**	**60**

References Books:

1. Advanced Android Application Development – Joseph Annuzzi, Lauren darcey, Shane Conder – 4th Edition, Addision – Wesley.
2. Android cookbook - Ian F. Darwin Oreilly
3. The Android Developer's CookBook – Building Application with Android SDK – 2nd Edition, Addision – Wesley.

Course Outcome:

After completion of the course students will be able:

- Able to develop mobile applications using advanced android api based on
- Able to use and explore Data storage in external and internal memory and database
- Able to develop android app that supports animation, multimedia, camera, sensor
- Able to develop android app that supports Network, Bluetooth-Wi-Fi
- Able to develop web service and retrieving data using JSON & xml
- Able to deploy and distribute android app on google play.

CS – 08: REACT JS & EXPRESS JS

Objectives:

- Articulate what React is and why it is useful.
- Explore various attributes of web development.
- Explore the basic architecture of a React application.
- Explore various web development techniques of this JavaScript and would learn new techniques based on industry requirement.
- Gain a deep understanding of JSX and Hooks.

Pre-Requisites: Java Script, HTML, CSS and OOPs,

Sr. No	Topics	Details	Weightage in %	Approx Lectures
1.	**Express JS & Java Script**	▪ **Java Script** ▪ Java Script Overview & Basics ▪ Variable, Conditional Statements, Loops in JS, ▪ Functions, Arrays & Events in JS ▪ ES6 Overview & Basics ▪ ES6 Classes, functions & Promises ▪ **Express JS** ▪ Setting up an app with ExpressJS, Routing in ExpressJS, Connecting views with templates, configurations and error handling.	**20**	**12**
2	**Introduction to JSX & REACT JS**	▪ **Introduction:** What is ReactJS? Installation or Setup, Hello World Program, Create a first app, folder structure ▪ **Components:** Creating components, Basic components, Nesting components, functional component, class component ▪ **Introduction to JSX:** JSX Programs ▪ **Props:** ReactJS Props, React State, Destructing Props and State, setState, methods as Props.	**20**	**12**
3	**Form Handling, components and fragments**	▪ **Event Handling:** Event Handling and Binding event handlers ▪ **Rendering:** Conditional Rendering and List Rendering, List and keys, Index as Key Anti-pattern ▪ **Introduction:** Basic form handling ▪ **Components:** Components Life Cycle Methods, Components Mounting Lifecycle methods, Components Updating Lifecycle methods, Pure Components	**20**	**12**

		▪ **Fragments**		
4	**Memo, Refs, Props and Context**	▪ **Memo** ▪ **Introduction to Refs:** Refs, Refs with Class Components, Forwarding Refs and Portals ▪ **Components:** Higher Order Components ▪ **Props Again!**: Rendering Props and Context ▪ **HTTP:** HTTP and React, GET and React, POST and React.	**20**	**12**
5	**Introduction to Hooks and its implementation**	▪ **Introduction:** React Hooks introduction, useState Hook, useState Previous state, useState with object, useState with array. ▪ **useEffect:** useEffect Hook, useEffect after render, Condionally run effects, run effects only once, useEffect with cleanup, useEffect with incorrect dependency. ▪ **Fetching data:** Fetching data with useEffect, useContext Hook ▪ **useReducer Hook:** useReducer – simple state and action, complex state and action, multiple useReducers ▪ **useContext:** useContext, useReducer, Fetching data with useReduer, useState vs useReducer	**20**	**12**
		Total	**100**	**60**

References Books

1. Learning React, Martin Bean, Kirupa Chinnathambi Pearson Addison Wesley
2. ReactJS Notes for Professional, GoalKicker, Website ebook,
3. The Road to React_ Your journey to master plain yet pragmatic React, LeanPub Book, Robin Wieruch -Independently Published (2020)
4. Codevolution. “ReactJS Tutorial for Beginners.” YouTube, YouTube, www.youtube.com/playlist?list=PLC3y8-rFHvwgg3vaYJgHGnModB54rxOk3.

Course Outcomes:

After completion of the course students will be able:

- ✓ Able to Understand the Actual Implementation of Object-Oriented Programming with Application.
- ✓ Able to Understand the use of JavaScript and various React Applications
- ✓ Able to Compute the various attributes of ReactJs Web applications
- ✓ Able to Remembering the components and syntax of ReactJS.
- ✓ Able to Construct a model to prepare a Single Page Applications
- ✓ Able to Implementing various logics and packages to ReactJS for generating the web applications.
- ✓ Able to Implementing the ReactJS with Hooks for web applications.

CS – 09: CLOUD COMPUTING WITH AWS

Objectives:

- Understand the architecture and infrastructure of cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud, various management and other distinguish services of AWS.
- Explore the fundamental concepts in datacenters to understand the trade-offs in power, efficiency and cost by the Load balancing approach and instances.
- Understand fundamental concepts of cloud storage and demonstrate their use in storage systems such as Amazon S3 and Database.
- Analyze various clouds Service models and apply them to solve problems on the cloud.
- Deploy applications over commercial cloud computing infrastructures such as AWS.

Pre-Requisites: Computer Networks, Operating Systems

Sr. No	Topics	Details	Weightage in %	Approx Lectures
1	**Introduction of Cloud & Amazon Web Service**	Introduction of cloud computing, how it works Types of cloud, what is Virtualization, Advantages of Cloud, AWS history, Dashboard, AWS Overview, Architecture	**20**	**12**
	Cloud Service Models	Software as a Service (SaaS): Introduction, Challenges in SaaS models: Model, SaaS Integration Services, Advantages and Disadvantages, Infrastructure As a Services (IaaS): Introduction, Virtual Machines, VM Migration Services, Advantages and Disadvantages. Platform As a service (PaaS): Introduction, Integration of Private, and Public Cloud, Advantages and Disadvantages.		
2	**Identity & Access Management**	IAM Overview and Policies, IAM Users, Groups, Access Key & Secret Access Key, MFA, Report	**20**	**12**
	Elastic Cloud Computing (EC2)	Amazon EC2 Overview, Elastic Block Storage (EBS),		

3		Amazon Machine Image (AMI), Instance Purchasing Options, Introduction to EC2 Instance Types Security Group Elastic, Public & private IP Overview, Amazon EBS & Snapshot, AWS CLI, Bootstrap Script, Elastic Load Balancing (ELB), Auto Scaling	**20**	**12**
	Virtual Private Cloud (VPC)	Amazon Virtual Private Cloud (VPC), Amazon VPC and Subnets, Route Table, Internet Gateway		
	Amazon Simple Storage Service (S3)	Simple Storage Service (S3), S3 Object Storage and Buckets, Security on bucket, Web Hosting, Logging & event, Glacier, Versioning & Lifecycle Policy, Cross region replication		
4	**Route 53**	DNS Records, Website Hosting, Routing Policy, Health Check	**20**	**12**
	Databases	Relation Database System, DB engine & Instance details, Security, Parameter group, Monitoring Resourcing, DynamoDB, Elasticache		
5	**CloudWatch & Monitoring**	Cloud Watch, Matrices, Alarm & notification, Log & billing Monitoring Other AWS monitoring	**20**	**12**
	Case Study on Open Source & Commercial Clouds	• Eucalyptus • Microsoft Azure • Amazon EC2		
		Total	**100**	**60**

Reference Books

1. Cloud Computing Bible, Barrie Sosinsky, Wiley-India, 2010
2. Cloud Computing: Principles and Paradigms, Editors: Rajkumar Buyya, James Broberg, Andrzej M. Goscinski, Wile, 2011
3. Judith Hurwitz, R Bloor, M.Kanfman, F.Halper "Cloud Computing for Dummies", Wiley India Edition, First Edition
4. Rajkumar Buyya, James Broberg, Andrzej M. Goscinski, "Cloud Computing: Principles and Paradigms", Wiley Publication,2011

5. Tim Mather, SubraKumara swamy, Shahed Latif, "Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance", O'ReillyMedia Inc, 2009
6. Mickey Iqbal 2010, " IT Virtualization Best Practices: A Lean, Green Virtualized Data Center Approach", MC Press
7. Frank H. P. Fitzek, Marcos D. Katz, "Mobile Clouds: Exploiting Distributed Resources in Wireless, Mobile and Social Networks", Wiley Publications, ISBN: 978-0-470-97389-9, Jan 2014.
8. Cloud Computing: Principles, Systems and Applications, Editors: Nikos Antonopoulos, Lee Gillam, Springer, 2012
9. Cloud Security: A Comprehensive Guide to Secure Cloud Computing, Ronald L. Krutz, Russell Dean Vines, Wiley-India, 2010
10. George Reese – Cloud Application Architectures: Building Applications and Infrastructures in the cloud – O'Reilly Media Inc., 2009
11. Anthony T. Velte, Toby J. Velte, Robert Elsenpeter – Cloud Computing A practical Approach – McGraw Hill, 2010

Course Outcome:

After completion of the course students will be able:

- Able to Understand the architecture and infrastructure of cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud, various management and other distinguish services of AWS.
- Able to Apply the fundamental concepts in datacenters to understand the trade-offs in power, efficiency and cost by the Load balancing approach and instances.
- Able to Illustrate the fundamental concepts of cloud storage and demonstrate their use in storage systems such as Amazon S3 and Database.
- Able to Analyze various clouds Service models and apply them to solve problems on the cloud
- Able to deploy applications over commercial cloud computing infrastructures such as AWS.

CS – 10: PRACTICAL - 1 (BASED ON CS-07)	
Topics	**Marks**
APPLICATOIN DEVELOPMENT USING ADVANCED ANDROID	**100**

CS – 11: PRACTICAL - 2 (BASED ON CS-08 and CS-09)	
Topics	**Marks**
• REACT JS & EXPRESS JS • CLOUD COMPUTING WITH AWS	**100**

Note:

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

CS – 12: 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 previous semester or current semester. **(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)**	

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.