Title of the course: Visualization and App Development

Course code: DS208

Credit: 2-1-2-0-4 **Total contact hours:** 52 hours

Objective: On completion of this course, the learner should be able

- To apply exploratory data analysis
- To successfully build, debug and deploy android apps.

Prerequisites: Knowledge of OOPs, Web development basics, Knowledge of OS

Unit 1: Visualization and Exploratory Data Analysis 8 Hours

- What is data? Numerical summarization, measure of similarity and dissimilarity, visualization
- Principles of Analytic Graphics, Exploratory Graphs, Base Plotting System, Lattice Plotting System,
- Various plots using python , R and Tableau: histogram, kernel density plots, combining plot styles, box and violin plots, regression plots, heat maps and clustered matrices,
- ggplot2, working with color.

Unit 2: Android OS, Ecosystem & Basics 12 Hours

- Mobile Platforms & OSs; Approaches to mobile development; Android OS; Android System Architecture; Android App Lifecycle; Play Store
- Intro; Create Your First Android App; Layouts, Views and Resources; Text and Scrolling Views; Resources to Help You Learn
- Activities and Intents; The Activity Lifecycle and Managing State; Starting Activities with Implicit Intents
- Debugging your apps; Testing your app; Support libraries, and Backwards Compatibility

Unit 3: User Interface 12 Hours

- Screen Sizes; User Interaction - User Input Controls, Menus; Screen Navigation; RecyclerView
- Delightful User Experience; Drawables, Themes and Styles; Material Design; Providing Resources for adaptive layouts
- Testing the User Interface

Unit 4: Background Tasks 8 Hours

- Background Tasks; AsyncTask and AsyncTaskLoader; Connecting to the Internet; Broadcast Receivers; Services

- Triggering, Scheduling, and Optimizing Background Tasks; Notifications; Alarm Manager; Transferring Data Efficiently

Unit 5: Data Saving, Retrieving, Loading and ReST API **12 Hours**

- Overview to storing data
- Shared Preferences; App Settings
- SQLite; Firebase
- Sharing Data: Content Resolvers and Content Providers
- Using Loaders to Load and Display Data
- Connecting with API service endpoints
- JSON, Resources and Representation, Designing a ReST API, Creating and Deploying ReST API, Consuming ReST API inside Android App

References and reading:

- Bill Philips & Brian Hardy, ―Android Programming: The Big Nerd Ranch Guide
- Dawn Griffiths & David Griffiths, ―Head First Android Development
- Ian F. Darwin, ―Android Cookbook
- https://developer.android.com
- https://kotlinlang.org

Course Outcomes:

- Learners will understand analytic graphics and the base plotting system and apply plots to locate patterns in data
- Learners will understand the android ecosystem, android versions & compatibility across them.
- Learner will be able to design user interfaces specifically to be run native android devices.
- Learners will be able to evaluate which type of views & widgets are preferable for various use cases.
- Learners will be able to build and design navigation flows in an app.
- Learners will be able to connect the app to Android services or apps already available on the device.
- Learners will be able to build apps that can store data locally or remotely.