**COURSE PACK**

**SCHEME**

The scheme is an overview of work-integrated learning opportunities and gets students out into the real world. This will give what a course entails.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course Title** | Mobile Application Development | | | | **Course Type** | | | Integrated | | |
| **Course Code** | R1UC608C | | | | **Class** | | | B.Tech (CSE) VI Sem | | |
| **Instruction delivery** | **Activity** | **Credits** | **Credit Hours** | | **Total Number of Classes per Semester** | | | | **Assessment in Weightage** | |
| **Lecture** | 3 | 3 | |
| **Tutorial** | 0 | 0 | | **Theory** | **Tutorial** | **Practical** | **Self-Study** | **CIE** | **SEE** |
| **Practical** | 1 | 2 | |
| **Self-study** | 0 | 5 | |
| **Total** | 4 | 10 | | 45 | 0 | 15 | 75 | 50% | 50% |
| **Course Lead** | Dr. Savita Kumari | | | **Course Coordinator** | Dr. Swati | | | | | |
| **Names Course Instructors** | **Theory** | | | | **Practical** | | | | | |
| Dr. Savita Kumari | | | | Dr. Swati | | | | | |

**COURSE OVERVIEW**

The Mobile Application Development course is designed to provide learners with a comprehensive understanding of developing applications for the Android platform. Throughout this program, students will gain hands-on experience and practical knowledge of the key concepts, tools, and best practices in Android app development. By the end of the course, learners will be equipped with the skills necessary to create their own Android applications and deploy them to the Google Play Store. The course equips them with the skills to meet market demands, seize career opportunities, and contribute to the growth of the Android ecosystem both in India and abroad.

**PREREQUISITE COURSE**

|  |  |  |
| --- | --- | --- |
| **PREREQUISITE COURSE REQUIRED** | **YES /NO** | |
| **If, yes please fill in the details:** | **Prerequisite course code** | **Prerequisite course name** |
| **BCSE** | **Programming Fundamentals** |

**COURSE OBJECTIVE**

1. To familiarize students with the architecture, components, and development tools of the Android platform.
2. To gain a solid understanding of the fundamental principles of Moblie app development.
3. To explore and implement advanced features and functionalities in Android applications.
4. To enable students to create and publish apps on the Google Play Store and explore monetization options for Android apps.

**COURSE OUTCOMES (COs)**

A detailed description of what a student must be able to do at the completion of a course. There can be 3-6 statements/outcomes for every course (*suggestive* of at least one outcome per credit). A detailed description of what a student must be able to do at the completion of a course.

*While writing outcomes, it is helpful to use verbs that are measurable or that describe an observable action. Such verbs help faculty and students avoid misconceptions and misinterpretations as well. The best outcomes will include a description of the conditions and the acceptable performance level to be achieved by the learners/students.*

After the completion of the course, the student will be able to:

|  |  |
| --- | --- |
| **CO No.** | **Course Outcomes** |
| 103.1 | Remember and understand the architecture of Android, including its history, features, and directory structure. |
| 103.2 | Apply knowledge to design and develop user interfaces for Android applications |
| 103.3 | Analyze and utilize core components of Android to create android applications. |
| 103.4 | Evaluate the advanced features in Android app development, including SQLite databases, Bluetooth, geolocation, SMS, MMS, graphics, and animations. |
| 103.5 | Implement and publish Android app on Google Play |

**BLOOM’S LEVEL OF THE COURSE OUTCOMES**

Bloom's taxonomy is a set of hierarchical models used for the classification of educational learning objectives into levels of complexity and specificity. The learning domains are cognitive, affective, and psychomotor.

**INTEGRATED**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| CO No. | Remember (KL1) | Understand (KL2) | Apply (KL3) | Analyze (KL4) | Evaluate (KL5) | Create (KL6) |
| 103.1 | ✔ | ✔ |  |  |  |  |
| 103.2 |  |  | ✔ |  |  |  |
| 103.3 |  |  |  | ✔ |  |  |
| 103.4 |  |  |  |  | ✔ | ✔ |
| 103.5 |  |  |  |  |  | ✔ |

**PROGRAM OUTCOMES (POs):**

**PO1:**  An ability to independently carry out research /investigation and development work to solve practical problems.

**PO2:**  An ability to write and present a substantial technical report/document.

**PO3:** Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program.

**PROGRAMME SPECIFIC OUTCOME (PSO):**

**PSO1:** Have the ability to work with emerging technologies in computing requisite to Industry 4.0.

**PSO2:** Demonstrate application development skills learned through technical training and projects to solve real world problems.

**COURSE ARTICULATION MATRIX**

The Course articulation matrix indicates the correlation between Course Outcomes and Program Outcomes and their expected strength of mapping in three levels (low, medium, and high).

| **COs# / POs** | **PO1** | **PO2** | **PO3** | **PSO1** | **PSO2** |
| --- | --- | --- | --- | --- | --- |
| 103.1 | - | - | 1 | 1 | 1 |
| 103.2 | - | - | 3 | 2 | 3 |
| 103.3 | 1 | - | 3 | 3 | 3 |
| 103.4 | 3 | 1 | 3 | 3 | 3 |
| 103.5 | 1 | 2 | 1 | 1 | 2 |

**Note:** 1-Low, 2-Medium, 3-High

COURSE ASSESSMENT

The course assessment patterns are the assessment tools used both in formative and summative examinations.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Tools** | **CIE** | | | | | | Total CIE  marks | SEE | | |
| IA-1 | MTE | IA-2 | LAB | LAB EXAM |  | | |  |
| **Theory** | 25 | 50 | 25 |  |  | 100 | | | 100 |
| **Lab** |  |  |  | 25 | 25 | 50 | | | 100 |

Assignment, Quiz, Class test, SWAYAM/NPTEL/MOOCs and etc.

**COURSE CONTENT**

**(THEORY + PRACTICAL)**

|  |
| --- |
| **CONTENT** |
| **Theory:**  History of Android, Features of Android, Android Devices, Android Versions, Open Handset Alliance (OHA), Advantages of Android, Comparing Android with other platform, Architecture of Android. Android Directory Structure, Structure of Manifest files, Android Development Tools.  Views, Views Group, Widgets – Button, EditText, CheckBox, TextView, ToggleButton, Layouts, Styles, Themes, Orientation, Screen Size and Density, Unit of measurement - px, dp, sp and dpi,pt, conversion of dp to px  Activities, Activity life cycle,Intents, types of intents, Intent Filter, Fragment, fragment lifecycle, Services, Broadcast receivers, Content providers, Starting a new activity, Sending and Receiving of data.  SQLite database, Cursors and content values, Opening and closing Database, Sensors, Bluetooth, Geo Location, SMS & MMS, Graphics and Animation  Security Creating a signing certificate, Signing your applications for distribution, Publishing on Google Play, Monetization strategies, Application promotion strategies, Using Google Analytics  **Practical:**   * 1. Develop an application that uses GUI components, Font and Colours  1. Develop an application that uses Layout Managers and event listeners. 2. Develop a native calculator application. 3. Write an application that draws basic graphical primitives on the screen. 4. Develop an application that makes use of database. 5. Develop an application that makes use of RSS Feed. 6. Implement an application that implements Multi-threading. 7. Develop a native application that uses GPS location information. 8. Implement an application that writes data to the SD card. 9. Implement an application that creates an alert upon receiving a message. 10. Write a mobile application that creates alarm clock. 11. Create an application to display various activity life cycle. 12. Create an application to display fragment life cycle methods. 13. Create an application to display services life cycle. 14. Create an application that makes use of implicit and explicit intent. 15. Create an application for Broadcast sender and receivers. |

**LESSON PLAN FOR INTEGRATED COURSES**

**FOR THEORY 15 weeks \* 3 Hours = 45 Classes) (1credit = 1 Lecture Hour)  
FOR PRACTICAL 15 weeks \* 2Hours = 30 Hours lab sessions (1 credit = 2 lab hours)**

**FOR COURSE - BASED PROJECT 15 weeks \* 3 Hours = 45 Hours lab sessions**

**(1 credit = 3 self-Learning hours) (Not to mention in lesion plan)**

**THEORY**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **L-No** | **Topic for Delivery** | **Skill** | **Tutorial/Practical Pan** | **Competency** |
| 1 | History of Android, Features of Android, | Introduction to Android Development | Theory | Understanding Android architecture and history |
| 2 | Android Devices, Android Versions | Theory |
| 3 | Open Handset Alliance (OHA), | Practical |
| 4 | Advantages of Android | Theory |
| 5 | Comparing Android with other platforms | Theory |
| 6 | Architecture of Android | Theory |
| 7 | Android Directory Structure | Theory | Configuring Android Studio environment |
| 8 | Structure of Manifest files | Theory |
| 9 | Android Development Tools | Theory | Creating a basic Android application |
| 10 | Views | Basic UI Components - Button, EditText, CheckBox, TextView | Theory | Designing user interfaces with basic components |
| 11 | Views Group | Theory | Designing user interfaces with advanced components |
| 12 | Widgets | Basic UI Components - RadioButton, ImageView, Spinner | Theory | Designing complex and responsive user interfaces |
| 13 | Button | Theory |
| 14 | Layouts | Theory |
| 15 | Styles | Theory |
| 16 | Themes | Theory |
| 17 | Orientation, Screen Size and Density, | UI Layouts - Linear, Relative, Constraint, Frame | Theory |
| 18 | Unit of measurement - px, dp, sp and dpi, pt | Theory |
| 19 | Conversion of dp to px | UI Layouts - Table, Grid, ScrollView | Theory |
| 20 | Activities | Handling User Input - Buttons, EditText | Theory | Managing user input in Android apps |
| 21 | Activity life cycle | Theory |
| 22 | Intents, | Handling User Input - CheckBox, Radio Button | Theory | Communicating between activities using intents |
| 23 | Types of intents | Theory |
| 24 | Intent Filter | Fragments - Creating and Managing | Theory |
| 25 | Fragment lifecycle | Fragments - Communication with Activity | Theory | Implementing fragments in Android apps, Managing fragment lifecycle in Android apps |
| 26 | Services | Creating and Starting Services | Theory | Implementing services in Android apps |
| 27 | Broadcast receivers | Registering Broadcast Receivers | Theory | Handling broadcasted events in Android apps |
| 28 | Content providers | Implementing Content Providers | Theory | Managing data storage and retrieval in Android |
| 29 | Starting a new activity | Navigating between Activities | Theory | Managing activity navigation in Android apps |
| 30 | Sending and Receiving data | Sending data between Activities | Theory | Exchanging data between activities in Android |
| 31 | SQLite database | Creating and Managing SQLite Databases | Theory | Working with SQLite databases in Android apps |
| 32 | Cursors and content values | Querying and Updating SQLite Databases | Theory | Manipulating data in SQLite databases |
| 33 | Opening and closing Database | Working with SQLite in Android Apps | Theory | Properly managing SQLite database connections |
| 34 | Sensors | Accessing Sensors Data | Theory | Utilizing sensors in Android apps |
| 35 | Bluetooth | Establishing Bluetooth Connections | Theory | Implementing Bluetooth functionality |
| 36 | Geo Location | Getting Location Data | Theory | Utilizing geolocation in Android apps |
| 37 | SMS & MMS | Sending and Receiving SMS and MMS | Theory | Integrating SMS and MMS features in Android apps |
| 38 | Graphics and Animation | Creating Graphics and Animations | Practical | Adding visual effects to Android apps |
| 39 | Security | Creating a Signing Certificate | Theory | Securing Android apps with signing certificates |
| 40 | Signing your applications for distribution | Signing APK for Release | Theory | Releasing Android apps on Google Play Store |
| 41 | Publishing on Google Play | Preparing App for Google Play Store | Theory |
| 42 | Monetization strategies | Exploring App Monetization Options | Theory | Implementing monetization strategies |
| 43 | Application promotion strategies | Promoting Android Apps | Theory | Promoting Android apps to increase visibility |
| 44 | Using Google Analytics | Implementing Analytics in Android Apps | Theory | Tracking app usage and user behavior |
| 45 | Revision |  |  |  |

**PRACTICAL**

| **L-No** | **Topic for Delivery** | **Tutorial/ Practical Plan** | **Skill** | **Competency** |
| --- | --- | --- | --- | --- |
| 1 | Develop an application that uses GUI components, Font and Colors | Create a basic Android app with GUI components and customize font and colors | Android app development basics | Designing user interfaces with GUI components |
| 2 | Develop an application that uses Layout Managers and event listeners | Design an Android app with different layout managers and handle event listeners | Android app development basics | Implementing layouts and event handling |
| 3 | Create an application to display various activity life cycle | Develop an Android app that demonstrates the different lifecycle methods of an activity | Android app development basics | Understanding and implementing activity lifecycle methods |
| 4 | Create an application to display fragment life cycle methods | Build an Android app that showcases the lifecycle methods of fragments | Android app development basics | Understanding and implementing fragment lifecycle methods |
| 5 | Create an application to display services life cycle | Design an Android app that demonstrates the lifecycle of services | Android app development basics | Understanding and implementing service lifecycle methods |
| 6 | Create an application that makes use of implicit and explicit intents | Develop an Android app that utilizes both implicit and explicit intents for navigation and communication between components | Android app development basics | Applying and utilizing implicit and explicit intents |
| 7 | Create an application for Broadcast sender and receivers | Build an Android app that sends and receives broadcast messages using broadcast receivers | Android app development basics | Implementing broadcast sender and receiver components |
| 8 | Develop a native calculator application | Build a calculator app with arithmetic operations and user input handling | Android app development basics | Implementing calculator functionality |
| 9 | Write an application that draws basic graphical primitives on the screen | Create an Android app that can draw basic shapes and graphics on the screen | Graphics and animation | Implementing basic graphics in Android apps |
| 10 | Develop an application that makes use of a database | Design an app that integrates SQLite database and performs CRUD operations | Database management | Working with databases in Android apps |
| 11 | Develop an application that makes use of an RSS Feed | Create an app that fetches and displays RSS feed data | Network communication | Integrating RSS feed functionality |
| 12 | Implement an application that implements Multithreading | Build an app that utilizes multithreading for concurrent tasks | Multithreading | Implementing multithreading in Android apps |
| 13 | Develop a native application that uses GPS location information | Design an app that accesses and displays GPS location data | Hardware integration | Utilizing GPS functionality in Android apps |
| 14 | Implement an application that writes data to the SD card | Create an app that can write and retrieve data from the device's SD card | File I/O | Managing SD card operations in Android apps |
| 15 | Implement an application that creates an alert upon receiving a message | Build an app that triggers an alert when a message is received | Messaging | Handling incoming messages in Android apps |
| 16 | Write a mobile application that creates an alarm clock | Design an app that functions as an alarm clock with set alarms and notifications | Android app development basics | Implementing alarm clock functionality |

**BIBLIOGRAPHY**

### **Text Book**

1. Android: A Programming Guide by J.F. DiMarzio (50%)
2. Android Programming for Beginners Third Edition by John Horton (50%)
   * **Reference Books**
3. Programming android by Zigurd Mednieks
4. Android User Interface Design: Turning Ideas and Sketches into Beautifully Designed Apps byIan G. Clifton

## Journals/Magazines/Govt. Reports/Gazatte/Industry Trends

1. International Journal of Human–Computer Interaction: Taylor and Francis.
2. [International Journal of Human-Computer Studies](https://www.sciencedirect.com/journal/international-journal-of-human-computer-studies) :Science Direct
   * **Webliography**
3. <https://developer.android.com/courses>
4. <https://learndigital.withgoogle.com/digitalgarage/course/android-developer>
   * **SWAYAM/NPTEL/MOOCs Certification**
5. <https://nptel.ac.in/courses/106106147>
6. <https://onlinecourses.swayam2.ac.in/nou21_ge41/preview>

PROBLEM-BASED LEARNING

Exercises in Problem-based Learning (Assignments) (Min 45 Problems\*)

| **SNo** | **Problem** | **Bloom's Taxonomy Level** |
| --- | --- | --- |
| 1 | Develop an application that displays "Hello, World!" on the screen. | KL2 |
| 2 | Create an app that allows users to input their name and displays a personalized welcome message. | KL3 |
| 3 | Develop a calculator app that performs basic arithmetic operations (addition, subtraction, multiplication, division). | KL3 |
| 4 | Design an app that converts temperature between Celsius and Fahrenheit. | KL3 |
| 5 | Create an app that plays a sound or music when a button is pressed. | KL3 |
| 6 | Develop a currency converter app that converts between different currencies. | KL3 |
| 7 | Design an app that displays random quotes or facts when a button is clicked. | KL3 |
| 8 | Create a weather app that fetches and displays current weather information for a specific location. | KL4 |
| 9 | Develop a notes-taking app that allows users to create, edit, and delete notes. | KL4 |
| 10 | Design a recipe app that displays recipes with ingredients and instructions. | KL4 |
| 11 | Create a stopwatch app that starts, stops, and resets the timer. | KL4 |
| 12 | Develop a countdown timer app with adjustable time settings and a notification when the time is up. | KL4 |
| 13 | Design a quiz app with multiple-choice questions and keeps track of the user's score. | KL4 |
| 14 | Create a flashlight app that turns the device's camera flash on and off. | KL4 |
| 15 | Develop a music player app that allows users to play, pause, and skip songs. | KL4 |
| 16 | Design a calendar app that allows users to add, edit, and delete events. | KL4 |
| 17 | Create a photo editing app that applies filters and effects to images. | KL4 |
| 18 | Develop a reminder app that sends notifications for important tasks or events. | KL4 |
| 19 | Design a chat app that allows users to send and receive messages. | KL5 |
| 20 | Create a location-based app that displays nearby restaurants, shops, or landmarks. | KL5 |
| 21 | Develop a fitness tracking app that records and displays user's exercise data (steps, distance, calories burned). | KL5 |
| 22 | Design a to-do list app that helps users manage their tasks and deadlines. | KL5 |
| 23 | Create a social media app that allows users to post, like, and comment on posts. | KL5 |
| 24 | Develop a music streaming app that plays songs from an online database. | KL5 |
| 25 | Design a language learning app that provides lessons, quizzes, and vocabulary exercises. | KL5 |
| 26 | Create a camera app that captures photos and allows users to apply filters and share them. | KL5 |
| 27 | Develop a ride-sharing app that connects drivers and passengers for shared transportation. | KL6 |
| 28 | Design a news app that displays headlines, articles, and allows users to save articles for offline reading. | KL6 |
| 29 | Create a fitness challenge app that sets goals and tracks progress for various fitness activities. | KL6 |
| 30 | Develop a barcode scanner app that scans and provides product information from barcodes. | KL6 |
| 31 | Design a travel planning app that suggests itineraries, attractions, and booking options. | KL6 |
| 32 | Create a virtual reality app that offers immersive experiences using VR technology. | KL6 |
| 33 | Develop a food delivery app that allows users to order food from local restaurants. | KL6 |
| 34 | Design an augmented reality app that overlays digital information on the real world. | KL6 |
| 35 | Create a language translation app that translates text or speech between different languages. | KL6 |
| 36 | Develop a navigation app that provides turn-by-turn directions and real-time traffic information. | KL6 |
| 37 | Design a video streaming app that plays movies, TV shows, or live streams. | KL6 |
| 38 | Create an e-commerce app that allows users to browse and purchase products online. | KL6 |
| 39 | Develop a social networking app that connects users based on shared interests or activities. | KL6 |
| 40 | Design a meditation app that offers guided meditation sessions and relaxation techniques. | KL6 |
| 41 | Create a virtual assistant app that responds to voice commands and performs tasks. | KL6 |
| 42 | Develop a productivity app that helps users organize their tasks, schedules, and goals. | KL6 |
| 43 | Design an educational app that provides interactive lessons, quizzes, and progress tracking. | KL6 |
| 44 | Create a budgeting app that helps users track their expenses and manage their finances. | KL6 |
| 45 | Develop a ticket booking app that allows users to book tickets for movies, events, or flights. | KL6 |

Dr. Savita Kumari

Course-Lead