**NIRMA UNIVERSITY**

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| **Institute:** | Institute of Technology |
| **Name of Programme:** | BTech CSE, Integrated BTech (CSE)-MBA,<br>BTech CSE (Artificial Intelligence & Machine Learning) |
| **Course Code:** | XXXX |
| **Course Title:** | Mobile Application Development |
| **Course Type:** | Department Elective-I |
| **Year of Introduction:** | 2024-25 |

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**Course Learning Outcomes (CLO):**

At the end of the course, the students will be able to –

1. explain the mobile application development approaches, platforms, tools, and development environment (BL2)
2. make use of basic building blocks, user interface components, and communication components to develop mobile applications (BL3)
3. develop Android applications through database storage and data sharing (BL6)
4. elaborate the use of advanced APIs related to sensors, web, networks, and location-based services. (BL6)

| Unit | Contents | Teaching Hours (Total 45) |
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| Unit-I | **Introduction to Mobile Application Development:** Mobile Operating Systems, Mobile Application Development Approaches, Mobile Applications Development Platforms<br>**Introduction to Android:** The Android Platform, Android Studio, Android SDK, Android Installation | 05 |
| Unit-II | **Android Application Design Essentials:** Android Context, Activities, Intents, Receiving and Broadcasting Intents, Services, Android Manifest File, Intent Filter and Permissions<br>**Android User Interface Design Essentials:** User Interface Elements and Designing User Interface with Layouts<br>**Notifications and Alarms:** Performance and Memory Management, Android Notifications and Alarms | 12 |
| Unit-III | **Storing and Retrieving Data:** Synchronization and Replication of Mobile Data, Storing and Retrieving data from SQLite, Working with Content Provider, Reading and Writing to Contacts | 10 |
| Unit-IV | **Graphics:** Performance and Multithreading, Graphics and UI Performance, Android Graphics, Android Multimedia, Accessing Device Sensors, Accessing Camera, Data and Files, Working with Videos, Images and Audio. | 08 |
| Unit-V | **Communications via Network and the Web:** Communications Model, Android Networking and Web Telephone, Wireless Connectivity and Mobile Apps, Android Telephony<br>**Mobility and Location-Based Services:** Working Offline Sync and Caching, Android Field Service App | 10 |

**Self-Study:**
The self-study contents will be declared at the commencement of the semester. Around 10% of the questions will be asked from self-study contents

**Suggested Readings/ References:**


1. Brian and Bill Phillips, 'Android Programming: The Big Nerd Ranch Guide (Big Nerd Ranch Guides)', Addison-Wesley
2. Griffiths, Dawn, and David Griffiths. 'Head First Android Development', O'Reilly Media.
3. Reto Meier, Professional Android 4 Application Development, Wrox Publication
4. Afreen C. Firza, 'Mobile Applications Development', Book Rivers
5. Wei-Meng Lee, Beginning Android 4 Application Development, Wrox Press
6. Greg Nudelman, Android Design Patterns, Interaction Design Solutions for Developers, John Wiley & Sons


**Laboratory Work:**
Laboratory work will be based on the above syllabus with a minimum of 10 experiments to be incorporated. The students in a suitable group size will design and perform one experiment as a part of Laboratory work.

| Sr. No. | List of Experiments/Exercises | Hours |
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| 1 | To configure and understand the Android structure and IDE tool with Android Studio.<br>Description: Make sure you have installed at least 2 Android APIs and run the Hello World program on virtual and real devices. | 02 |
| 2 | To design and develop a basic level calculator that includes input items from the user and performs operations, namely addition, subtraction, multiplication, and division, and displays the results to the user. | 04 |
| 3 | To develop an application, use list view to list out some items on the screen. By selecting any of the items, the system displays complete information about that item. | 02 |
| 4 | To develop an application using spinner view to list some items on the screen by selecting any of the items, the system displays complete information about that item. Also, the addition and deletion of the items from the spinner view are shown. | 02 |
| 5 | To create a user-defined notification for some broadcast event that occurred. (either system event or user-defined events you can consider) | 02 |
| 6 | To create a user-defined notification for some broadcast event that occurred. (either system event or user-defined events you can consider) | 02 |
| 7 | To implement a Database in Android - using SQLite (Local Database)<br>To Design a database application that has the following functionalities:<br>a) Implement a database-oriented application for mobile: Create a database, create a minimum of two tables, and then show the following operation:<br>i) Addition of records,<br>ii) Updating of records,<br>iii) Deletion of records,<br>iv) retrieving of records based on some criteria searching for records<br>b) Show the Navigation of records through first, last, previous, and next operations. | 04 |

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| 8 | To design an app that implements an animated welcome activity of your application, which shows some kind of animation using a multithreading concept. | 04 |
| 9 | To demonstrate Parsing: design an app that uses JSON Parsing (retrieving data from a server) for an application to fetch data from a remote server to a local system. | 04 |
| 10 | a) To design an app that shows the user's current location on Google Maps.<br>b) Introduction to Flutter technology | 04 |