Module Code and Title: CTE308 Mobile Application Development
Programme: BE in Information Technology
Credit: 12
Module Tutor: Pema Galey/ Manoj Chhetri/ Karma Wangchuk/ Yeshi Jamtsho
Module Coordinator: Pema Galey

General objectives:
This module empowers students to create and construct mobile applications utilizing various platforms and tools. Additionally, it imparts knowledge and proficiency in testing and deploying applications. This module provides comprehensive training in mobile application development, covering the Android and iOS platforms as well as cross-platform development techniques. Students will learn to create engaging and functional mobile applications using industry-standard tools and frameworks.

Learning outcomes:
On completion of the module, students will be able to:
1. Explain different mobile application development platforms.
2. Compare Android and iOS architectures.
3. Develop android phone apps.
4. Develop iOS phone apps.
5. Develop cross-platform apps.
6. Perform testing of applications before publishing the apps.
7. Describe publishing approaches for mobile applications.
8. Identify the monetizing methods and strategies.

Learning and teaching approach:

Type	Approach		Hours per Week	Total Credit Hours
Contact	Lecture		3	90
	Practical		3	
Independent Study	Project		1	30
	Self study		1	
Total				**120**

Assessment Approach:

Assessment components consist of **Continuous Assessment (CA) Theory - 35%** and **Continuous Assessment (CA) Practical - 65%**. The CA Theory will consist of Mid-Term test (15%), Assignment (10%) and Quiz (10%), and CA Practical consist of Lab Work (15%), Project-I (20%) and Project-II (30%). Assessments will be carried out continuously through the following assessment components:

A.   Mid-Term Test: (15%)
       Students will take a closed book written exam of 1-hour duration covering Unit-I to Unit-II. The exam will be marked out of 15 marks.

B. Assignment: (10%)
       One assignment will be given in the 2nd Week covering Unit-I. This will be assessed based on the following criteria:
       1   Cover Page and Format
       2   Submission Deadline

5	Content
2	References

C. Quiz: (10%)

An online closed-book quiz of an hour's duration will be conducted in the 14th Week on the VLE to test students' understanding of concepts in mobile application development.

D. Lab Work: (15%)

Students will be given Lab exercises every week to implement what they have learnt from the lectures and exercises. At least, five lab works will be evaluated based on the following criteria (15 marks):

8	Correctness/Method/Approach/Process
3	Solution readability and concise inclusion of lab exercise
2	Format and organization
2	Timely submission of the lab exercise file

E. Project-I: (20%)

Students will undertake a project individually. The student will start selecting their project topic in the 3rd week which they will have to cover the android development concepts. This project-I will cover Unit II for the duration of 3 weeks from the 4th week till the end of the 6th week.

For the assessment of the project-I, students will have to provide a demonstration of their project and will be assessed out of 20 marks as given below:

a. Conceptual Note (5%)

1	Originality of the concept
1	Relevancy
2	Clarity of the proposal
1	Submission Deadline

b. Project Assessment (15%)

3	Appropriate usage of Components
4	Graphical User Interface Aesthetic
4	Completeness of the Work
2	Confidence
2	Output Demonstration

F. Project-II: (30%)

Students will undertake a project-II individually. The student will start selecting their project topic in the 7th week which they will have to use cross-platform application development covering both Android and iOS concepts. The project-II will have a duration of 5 weeks from the 8th week till the end of the 12th week, and the project presentation will be done in the 13th and 14th weeks.

For the assessment of the project-II, students will have to provide a demonstration of their project and will be assessed out of 30 marks as given below:

a. Project Proposal (5%)

1	Aim and Objective
1	Originality of the concept

        1   Feasibility
        1   Expected Outcome
        1   Work Plan

b. Project Code Assessment (15%)
        2   Appropriate usage of Components
        3   Graphical User Interface Aesthetic
        3   Responsiveness
        1   Comment
        3   Code Readability and Reusability
        3   Completeness of the Work

c. Project Presentation (10%)
        3   Presentation Technique
        2   Confidence
        3   Q&A
        2   Time management

Overview of the assessment approaches and weighting:

Areas of Assignments	Quantity	Weighting (%)
A. Mid-Term Test	1	15
B. Assignment	1	10
C. Quiz	1	10
D. Lab Work	5-10	15
E. Project-I	1	20
F. Project-II	1	30
Total		**100**

Prerequisite: None

Subject Matter:
Unit I: Introduction to Mobile App Development
1. Overview of Mobile Development
2. Introduction to mobile platforms (Android, iOS).
3. Key differences between native and cross-platform development.
4. Introduction to cross-platform frameworks.

Unit II: Android Application Development
1. Android fundamentals and architecture
2. Setting Up Development Environments: installing Android Studio for Android
3. Basics of Java/Kotlin programming for Android.
4. User interface development with XML and Android Studio.
5. Activities, Intents, and Fragments.
6. Local data storage with Shared Preferences, Content Providers and SQLite databases.
7. Networking in Android: HTTP requests and RESTful APIs.
8. Implementing location-based services.

Unit III: iOS Application Development
1. iOS Fundamentals and Architecture

2. Development and Setting up Xcode for iOS development.
3. Introduction to Swift programming language.
4. Interface Builder and UIKit framework.
5. Navigation controllers and storyboards.
6. Core Data for local data storage.
7. Networking in iOS: URLSession and RESTful APIs.
8. Integrating device features like camera and sensors.

Unit IV: Cross-Platform Application Development
1. Popular cross-platform frameworks: The features, advantages and disadvantages.
2. Comparing and choosing the right framework.
3. Building basic cross-platform apps: Creating simple apps using a cross-platform framework.
4. Local storage and server-side storage

Unit V: Apps Publication & Business Issues
1. Testing and Debugging
2. Unit testing and debugging strategies for mobile apps.
3. Deployment Strategies
4. App Store Submission for Android and iOS.
5. Best practices for app deployment and updates.
6. Business: Monetizing Apps, App Monetization Strategies, Paid Apps, Ad-Supported Apps, In-App Purchases

List of Practical(s):
1. Create first Android App using Android Studio
2. Design UI/UX using Layouts, Views, Resources, Text and Scrolling Views for Android
3. Implement Activities and Intents on Android Studio.
4. Implement User Input Controls, Menus, Screen Navigation, Drawable, Themes, and Styles.
5. Implement Data storage using SQLite Database for Android.
6. Create a basic iOS Application using XCode.
7. Design UI/UX for iOS.
8. Implement data storage for iOS.
9. Create a basic cross-platform app.
10. Test Android and iOS applications.

Reading list:
Essential Reading
Iversen, J., & Eierman, M. (2018). *Mobile app development for iOS and Android* (2nd ed.). Burlington, VT: Prospect Press.
Lingras, P., Triff, M., & Lingras, R. (2017). *Building cross-platform mobile and web apps for engineers and scientists: An active learning approach* (1st ed.). Boston, MA: Cengage Learning.
Additional Reading
Gosling, J., Joy, B., Steele, G., Bracha, G., Buckley, A., & Smith, D. (2017). *The java® language specification* (10th ed.). Redwood Shores, CA: Oracle America, Inc.
Griffiths, D. & Griffiths D. (2015). *Head first Android development: A brain-friendly* guide (1st ed.). Sebastopol, CA: O'Reilly Media, Inc.
Horton, J. (2015). *Android programming for beginners.* Birmingham: Packt Publishing Ltd.

Date: January 2024