

Syllabus Details

Syllabus ID:	12848
Syllabus Name:	Multiplatform Mobile App Development_Phát triển ứng dụng di động đa nền tảng
Course Name English:	Multiplatform Mobile App Development
Subject Code:	MMA301
NoCredit:	3
Degree Level:	Bachelor
Time Allocation:	Study hour (150h) = 45h contact hours + 1h TE + 85' PE + 103.6h self-study
Pre-Requisite:	FER202
Description:	<p>This course helps learners master the knowledge of React Native. Learners can quickly develop mobile applications running on iOS and Android platforms. Contents to be implemented include:</p> <ul style="list-style-type: none">- Overview of React Native and its benefits.- Setting up the development environment.- Understanding components and navigation.- Hands-on experience with iOS simulator and Android emulators- Techniques for styling applications.- State management strategies using hooks and Redux.- Managing user input and touch events.- Using FlatList and SectionList for data presentation.- Mobile Notifications: Learn to integrate personalized notifications to enhance user engagement.- Databases: Explore using SQLite, Firebase for data management.- Debugging techniques and tools.- Publishing applications using Expo.- Integrate mobile app with Gemini AI

StudentTasks:	<ul style="list-style-type: none"> - Students must attend at least 80% of contact slots in order to be accepted to the final examination. - Student is responsible to do all exercises given by instructor in class or at home and submit on time - Promptly access to the https://flm.fpt.edu.vn/ for up-to-date course information
Tools:	<ul style="list-style-type: none"> - Visual Studio Code (https://code.visualstudio.com) - Internet - ChatGPT (https://chatgpt.com) - Gemini (https://gemini.google.com/app) - V0 by Vercel (https://v0.dev)
Scoring Scale:	10
DecisionNo MM/dd/yyyy:	437/QĐ-ĐHFPT dated 04/25/2025
IsApproved:	True
Note:	
MinAvgMarkToPass:	5
IsActive:	True
ApprovedDate:	4/25/2025

3 material(s)

MaterialDescription	Author	Publisher	PublishedDate	Edition	ISBN	IsMainMaterial	IsHardCopy	IsOnline	Note
React Native: Developing Android and iOS Apps		Coursera							https://www.coursera.org/learn/mobile-app-notifications-databases-publishing
Mobile App Notifications, Databases, & Publishing		Coursera							https://www.coursera.org/learn/react-native-developing-android-and-ios-apps
https://docs.expo.dev/		Expo							https://docs.expo.dev/

13 LO(s)

CLO Name	CLO Details
CLO1	Understand what React Native is and how it can be used

CLO10	Be able to integrated Gemini AI and Apply GenAI in solving problem
CLO11	Be able to integrated Firebase services (FCM, Realtime database,...)
CLO12	Understand how to push notification in React Native apps
CLO13	Understand how to publish an application
CLO2	Understand how React Native works
CLO3	Be able to build the React-native Application
CLO4	Be able to understand the Components used for Mobile development
CLO5	Understand how to style for React Native apps
CLO6	Be able to manage state using hooks and Redux
CLO7	Be able to using list in react-native for data presentation
CLO8	Be able to use Debugging and Developer's Tools
CLO9	Understand how to Modeling and Storing data

[View mapping of CLOs to PLOs](#)

Session	Topic	Learning-Teaching Type	LO	ITU	Student Materials	Student's Tasks
1	Course Introduction	Offline	CLO1	I	Slides	Listen actively, understand course structure, objectives, grading, and expectations. Ask clarifying questions.
2	Introduction to React Native - What is React Native - Features and Use Cases of React Native - React Native architecture	Offline	CLO1, CLO2	I	Slides	Understand core concepts, features, pros/cons of React Native. Take notes. Ask questions.
3	Setting up the React Native Development Ecosystem - Common Dependencies - Node.js Installation	Offline	CLO3	TU	Slides	Follow instructions to install Node.js, Watchman, IDE extensions, Expo CLI dependencies. Troubleshoot setup issues with guidance.

	<ul style="list-style-type: none"> - Android Studio Setup - Android SDK Configuration - Environment Variables: Set up the ANDROID_HOME environment 					
4	Setting up the React Native Development Ecosystem (Cont) <ul style="list-style-type: none"> - Expo and Its Features - Install Expo Go on your device - Expo CLI - Setting up the Environment using Expo Snack 	Offline	CLO3	TU	Slides	Complete Expo setup. Create a new project using Expo CLI. Run the basic app on a device or simulator.
5	Emulator and Simulator Basics in React Native Development <ul style="list-style-type: none"> - Understanding Android SDK Emulator - Android SDK Emulator - Working with Android Emulator using Android Studio - iOS Simulator - Configuring iOS Simulator 	Offline	CLO3	TU	Slides	Set up and configure an Android Emulator (AVD) and/or iOS Simulator. Practice running their app on these virtual devices.
6	<ul style="list-style-type: none"> - Navigating the project structure in React Native using Expo commands - Compare Expo CLI versus React Native CLI 	Offline	CLO2, CLO3	I	Slides	Explore the folders and files in a standard Expo/React Native project. Understand the purpose of key files (App.js, package.json, assets, etc.).
7	Introduction to Virtual DOM in React Native	Offline	CLO1, CLO2	I	Slides	Understand the concept of the Virtual DOM and how it contributes to React Native's performance. Compare briefly with the web DOM.

8	Introduction to Basic Components - View - Text - Image - Button - Text Input - Scroll View - Flat List	Offline	CLO4	I	Slides	Learn the syntax and basic props for View, Text, Image, Button, TextInput. Practice using these components to build a simple static screen layout.
9	Introduction to React Navigation Components Implementation of Stack, Drawer, and Tab Navigation	Offline	CLO4	TU	Slides	Implement basic stack navigation between two or more screens using react-navigation. Understand navigator setup.
10	Introduction to Stylesheets	Offline	CLO5	I	Slides	Learn how to create and apply styles using StyleSheet.create Practice styling basic components (color, font size, margins, padding)
11	Styling with Layouts and Flexbox	Offline	CLO5	TU	Slides	Practice using Flexbox properties (flexDirection, justifyContent, alignItems, flex, etc.) to create responsive layouts. Complete layout exercises.
12	Using Styled-Components in React Native	Offline	CLO5	TU	Slides	Understand the concept of CSS-in-JS with Styled Components. Practice defining and using styled components. (Optional: Refactor previous styles).
13	Managing State with useState and useReducer	Offline	CLO6	TU	Slides	Practice using useState for simple state variables and useReducer for more complex state logic within components. Implement examples like counters or simple forms.
14	Using Context API for State Management	Offline	CLO6	TU	Slides	Implement state sharing between components using the Context API. Understand createContext, Provider, and useContext.

15	Redux in React Native	Offline	CLO6	TU	Slide	Understand the core Redux concepts (actions, reducers, store, dispatch). Practice connecting a component to the Redux store (if guided).
16	Handling TextInput and Forms	Offline	CLO4	TU	Slides	Build a form with TextInput fields. Implement controlled components by managing input state using useState. Handle form submission.
17	Validating Forms with Formik and Yup	Offline	CLO4	TU	Slides	Integrate Formik to manage form state and Yup for validation rules in their practice form. Display validation errors.
18	Using AsyncStorage for Persistent Data	Offline	CLO9	TU	Slides	Practice saving simple data (e.g., user preferences, a token) to AsyncStorage and retrieving it when the app restarts.
19	Introduction to FlatList and SectionList	Offline	CLO7	ITU	Slides	Practice rendering large lists of data efficiently using FlatList. Understand data, renderItem, keyExtractor. Implement a SectionList for grouped data.
20	Implementing Pull-to-Refresh	Offline	CLO7	TU	Slides	Add pull-to-refresh functionality to a FlatList or ScrollView using RefreshControl. Trigger a data refresh action.
21	Implement Infinite Scrolling	Offline	CLO7	TU	Slides	Implement infinite scrolling (load more data on reaching the end) on a FlatList using onEndReached prop.
22	Assignment 1	Offline	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7, CLO9	U	Slides, assignment's questions	Work actively on Assignment 1, applying concepts from sessions 1-21. Ask specific questions for clarification or help.
23	Assignment 1	Offline	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7, CLO9	U	Slides, assignment's questions	Continue working on Assignment 1. Focus on problem-solving and implementation. Collaborate if permitted.
24	Assignment 1 Review Project Introduction	Offline	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7, CLO9	TU	Slides, assignment's questions	Submit Assignment 1. Pay attention to the review, noting common mistakes or best practices. Understand the final project scope and start brainstorming. Ask questions about the project.
25	Progress Test 1	Offline	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7, CLO9	U		Take the test

26	Working with React DevTools - Inspecting Components - Using Context API	Offline	CLO8	ITU	Slides	Practice using React DevTools to inspect component hierarchy, view/edit props and state in their own or example apps.
27	Working with React DevTools (Cont) - Performance Profiling	Offline	CLO8	TU	Slides	Practice using the Profiler tab in React DevTools to identify rendering bottlenecks in simple scenarios.
28	Handling Errors and Debugging - Importance of Error Handling - Common Error Types - Error Handling Techniques:	Offline	CLO8	TU	Slides	Learn common types of errors. Practice using console logs and the debugger (Chrome DevTools) for basic debugging. Understand Error Boundaries concept.
29	Handling Errors and Debugging (Cont) - Debugging Tools	Offline	CLO8	TU	Slides	Practice setting breakpoints, inspecting variables, and stepping through code using the debugger.
30	Creating Android APK Files Handling Updates in React Native	Offline	CLO3, CLO13	TU	Slides	Understand the process for creating a release build (APK/AAB). Learn the concept of Over-the-Air (OTA) updates.
31	Mobile App Notifications, Databases, & Publishing Introduction	Offline	CLO11, CLO12, CLO13	I	Slides	Gain a high-level understanding of push notifications, local vs. remote databases, and the app store submission process.
32	Handling Notifications in Mobile Apps Notification Delivery Systems	Offline	CLO11, CLO12	TU	Slides	Understand the flow of push notifications (client registration, server sending, client receiving). Learn about permissions.
33	Creating Notifications in React Native	Offline	CLO12	TU	Slides	Practice setting up a library (e.g., expo-notifications) to request permissions and potentially receive local or test push notifications.
34	Embedded databases introduction - Local Storage - SQLite	Offline	CLO9, CLO11	I	Slides	Understand use cases for local databases. Learn basic SQL concepts relevant to SQLite. Practice setting up expo-sqlite.

	<ul style="list-style-type: none"> - Couchbase Lite - LevelDB - BerkeleyDB Best Practices for Developers					
35	CRUD Operations in Embedded Databases <ul style="list-style-type: none"> - Operations 	Offline	CLO9	TU	Slides	Practice writing and executing SQL queries for Create, Read, Update, and Delete operations in SQLite
36	CRUD Operations in Embedded Databases (cont) <ul style="list-style-type: none"> - Practical Application 	Offline	CLO9	TU	Slides	Apply CRUD operations to a practical example within their app (e.g., saving notes, user data locally). Handle asynchronous database operations.
37	Overview of Remote Databases	Offline	CLO9, CLO11	I	Slide	Understand the difference between local and remote databases. Learn about common remote database types (SQL, NoSQL) and BaaS options.
38	Connecting Mobile Apps to Remote Databases	Offline	CLO9, CLO11	TU	Slides	Practice making API calls to retrieve data from a sample public API or a simple backend provided by the lecturer. Handle responses and errors.
39	Introduction to Firebase	Offline	CLO11	I	Slides	Create a Firebase project. Understand the key services offered (Firestore/Realtime DB, Auth, etc.). Connect their React Native app to the Firebase project.
40	Explore Google Firebase	Offline	CLO11	TU	Slides	Explore the Firebase console. Practice basic data operations (adding/reading data) in Firestore or Realtime Database directly or through guided app integration.
41	Creating Notifications in React Native with Firebase	Offline	CLO11, CLO12	TU	Slides	Integrate Firebase Cloud Messaging (FCM) setup into their app. Practice receiving notifications sent via the Firebase console.
42	Gemini AI integration <ul style="list-style-type: none"> - Get API key - Project configuration 	Offline	CLO10	TU	Slides	Obtain a Gemini API key. Set up the necessary SDK/API call structure in their project. Configure the project securely.

43	Gemini AI integration (cont) - AI Model selection - Make prompt and processing result	Offline	CLO10	TU	Slides	Practice selecting an appropriate Gemini model. Formulate prompts and make API calls from the app. Display the AI-generated response.
44	Map integration - Request permission - Access location API	Offline	CLO4	TU	Slides	Install react-native-maps. Request location permissions. Get the device's current location and display it on a map component with a marker.
45	Image picker integration	Offline	CLO4	TU	Slides	Install expo-image-picker. Implement functionality to request permissions, open the device's image gallery or camera, and handle the selected image URI.
46	Assignment 2	Offline	CLO4, CLO8, CLO9, CLO10, CLO11, CLO12, CLO13	U	Slides, assignment's questions	Work actively on Assignment 2, integrating concepts from sessions 26-45 (debugging, APIs, Firebase, hardware features etc.). Ask specific questions.
47	Assignment 2	Offline	CLO4, CLO8, CLO9, CLO10, CLO11, CLO12, CLO13	U	Slides, assignment's questions	Continue working on Assignment 2, focusing on integration and problem-solving.
48	Assignment 2 review	Offline	CLO4, CLO8, CLO9, CLO10, CLO11, CLO12, CLO13	TU	Slides, assignment's questions	Submit Assignment 2. Pay attention to the review feedback. Finalize project preparation based on assignment experience.
49	Review	Offline	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7, CLO8, CLO9, CLO10, CLO11, CLO12, CLO13	TU	Slides	Actively participate in the review session. Ask questions on unclear topics from the entire course. Prepare for Progress Test 2 and Final Project Defense.
50	Review	Offline	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7, CLO8, CLO9, CLO10, CLO11, CLO12, CLO13	TU	Slides	Continue active review and Q&A. Solidify understanding of core and advanced concepts.

51	Review	Offline	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7, CLO8, CLO9, CLO10, CLO11, CLO12, CLO13	TU	Slides	Final opportunity for clarification before the test/defense. Consolidate notes and understanding.
52	Progress Test 2	Offline	CLO4, CLO8, CLO9, CLO10, CLO11, CLO12, CLO13	U		Take the test
53	Course summary	Offline	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7, CLO8, CLO9, CLO10, CLO11, CLO12, CLO13	TU	Slides	Reflect on the key skills and knowledge gained. Ask final questions about the course material or potential next steps in learning.
54	Course summary	Offline	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7, CLO8, CLO9, CLO10, CLO11, CLO12, CLO13	TU	Slides	Final wrap-up and Q&A session. Ensure all administrative aspects are clear.
55	Final Project Defense	Offline	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7, CLO8, CLO9, CLO10, CLO11, CLO12, CLO13	TU		Present their final React Native project. Demonstrate its functionality. Explain design choices and technical implementation. Answer questions effectively.
56	Final Project Defense	Offline	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7, CLO8, CLO9, CLO10, CLO11, CLO12, CLO13	TU		Present their final React Native project. Demonstrate its functionality. Explain design choices and technical implementation. Answer questions effectively.
57	Final Project Defense	Offline	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7, CLO8, CLO9, CLO10, CLO11, CLO12, CLO13	TU		Present their final React Native project. Demonstrate its functionality. Explain design choices and technical implementation. Answer questions effectively.

58	Final Project Defense	Offline	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7, CLO8, CLO9, CLO10, CLO11, CLO12, CLO13	TU		Present their final React Native project. Demonstrate its functionality. Explain design choices and technical implementation. Answer questions effectively.
59	Final Project Defense	Offline	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7, CLO8, CLO9, CLO10, CLO11, CLO12, CLO13	TU		Present their final React Native project. Demonstrate its functionality. Explain design choices and technical implementation. Answer questions effectively.
60	Final Project Defense	Offline	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7, CLO8, CLO9, CLO10, CLO11, CLO12, CLO13	TU		Present their final React Native project. Demonstrate its functionality. Explain design choices and technical implementation. Answer questions effectively.

0 Constructive question(s)

5 assessment(s)

Category	Type	Part	Weight	Completion Criteria	Duration	CLO	Question Type	No Question	Knowledge and Skill	Grading Guide	Note
Assignment	on-going	2	10.0%	>0	Guided and reviewed in tutorial sessions; Cont. at home	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7, CLO8, CLO9, CLO10, CLO11, CLO12, CLO13	practical exercises		Assignment 1: CLO1 - CLO7 Assignment 2: CLO1 - CLO13	Teachers support tutorials and students do them by themselves	It is allowed to use AI support to solve the assignment, however, students must provide evidence for the use of AI for support. Students need to fully store the prompt if using GenAI for support and provide it to the lecturer when necessary. Students must understand and master the products they create with the support of AI, can easily customize according to some small modification requests from the lecturer based on the knowledge learned in the course.

Practical Exam	on-going	1	20.0%	>0	85'	CL01, CL02, CL03, CL04, CL05, CL06, CL07, CL08, CL09, CL010,CL011,CL012,CL013	Preferable to be marked by scripts		problem(s) to solve by programming with AI integration covering CL01 - CL013	supervised by instructor	<ul style="list-style-type: none"> - It is allowed to use AI support to solve the assignment, however, students must provide evidence for the use of AI for support. Students need to fully store the prompt if using GenAI for support and provide it to the lecturer when necessary. - Students must understand and master the products they create with the support of AI, can easily customize according to some small modification requests from the lecturer based on the knowledge learned in the course. - 90% points for fixed function list serving the problem 10% points for students to freely create, apply reasonable AI features to expand the problem requirements
Progress test	on-going	2	10.0%	>0	20'-40'	CL01, CL02, CL03, CL04, CL05, CL06, CL07, CL08, CL09, CL010,CL011,CL012,CL013	essay or multiple choice	15-30 if multiple choice	PT 1: CL01 - CL07 PT 2: CL08 - CL013	supervised by instructor	<p>Progress test must be taken right after the last lectures of required material.</p> <p>Instructor has responsibility to review the test for students after graded.</p>
Project	on-going	1	20.0%	>0	Guided and reviewed in tutorial sessions; Cont. at home	CL01, CL02, CL03, CL04, CL05, CL06, CL07, CL08, CL09, CL010,CL011,CL012,CL013	a problem similar to real one		problem(s) to solve by programming with AI integration, covering CL01 - CL013	Individual or team work, guided by instructor, submission by a given deadline	<p>Students/student groups choose their own topics or solve topics assigned by the instructor</p> <p>80% of the score is assessed on non-AI functions</p> <p>20% of the score is assessed on AI</p>

											integration appropriate to the problem's business
Final exam	Final exam	1	40.0%	4	60'	CL01, CL02, CL03, CL04, CL05, CL06, CL07, CL08, CL09, CL010,CL011,CL012,CL013	multiple choice	50	all topics; more than 70% new questions (for the current semester);	supervised by proctor(s) sent by exam board	