Subject Description Form

Subject Code	EIE3109 (for BEng in EIE and BSc in IMT)
Subject Title	Mobile Systems and Application Development
Credit Value	3
Level	3
Pre-requisite / Co-requisite/ Exclusion	ENG2002 Computer Programming
Objectives	This course aims at providing students with an understanding of the real-time embedded and mobile systems, and the techniques essential to the design and implementation of mobile applications.
Intended Subject Learning Outcomes	**Upon completion of the subject, students will be able to:** Category A: Professional/academic knowledge and skills 1. Understand the structure of real-time operating systems for modern mobile computer systems. 2. Understand the programming techniques and tools for developing software that is run in modern mobile computer systems 3. Apply the knowledge to develop practical applications for modern real-time mobile computer systems. Category B: Attributes for all-roundedness 4. understand the creative process when designing solutions to a problem
Subject Synopsis/ Indicative Syllabus	1. Introduction Introduction to Embedded Systems – embedded real-time systems, embedded programming and program models, real-time operating system (RTOS). Introduction to Mobile Systems and Mobile Application Development – advancement of mobile devices, comparison of various mobile platforms (iOS, Android, Windows Phone, Blackberry, etc.), application design process. 2. iOS Application Development Introduction to iOS – system architecture, development environment (Xcode), MVC architecture. Introduction to Swift Programming – basic syntax, optional type, dictionary, closure, property observer, computed properties. 3. Android Application Development Introduction to Android OS – development environment (Android Studio), Android application basic (activity, service, content provider, broadcast receiver, intent resolution). User Interface – layout overview, user interface widget, user interface event handling, user notification. Data Storage – shared preference, internal storage, external storage, SQLite, content provider. Networking – Android network overview and management, socket and HTTP, Wi-Fi and Bluetooth, GPS & telephony. Multimedia – voice recording, image capturing, basic drawing & animation.

Teaching/Learning Methodology

Lectures: The subject matters will be delivered through lectures. Students will be engaged in the lectures through Q&A, discussions and specially designed classroom activities.

Tutorials: During tutorials, students will work on/discuss some chosen topics in small group. This will help strengthen the knowledge taught in lectures.

Laboratory and assignments: During laboratory exercises, students will perform hands-on tasks to practice what they have learned. They will evaluate performance of systems and design solutions to problems. The assignments will help students to review the knowledge taught in class.

While lectures and tutorials will help to achieve the professional outcomes, the open-ended questions in laboratory exercises and assignments will provide the chance to students to exercise their creatively in problem solving.

Assessment Methods in Alignment with Intended Subject Learning Outcomes

Specific Assessment Methods/Tasks	**% Weighting**	**Intended Subject Learning Outcomes to be Assessed (Please tick as appropriate)**			
		1	**2**	**3**	**4**
1. Continuous Assessment (total: 100%)					
• Homework and assignments	20%	✓	✓	✓	✓
• 2 Tests	60%	✓	✓	✓	✓
• Laboratory exercises	20%			✓	✓
Total	100%				

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Assignment, homework and laboratory exercises will require students to apply what they have learnt to solve problems. There will be open-ended questions that allow students to exercise their creativity in making design.

Tests: They assess students' achievement of the learning outcomes more rigorously.

Student Study Effort Expected

Class contact (time-tabled):	
• Lecture	24 Hours
• Tutorial/Laboratory/Practice Classes	15 hours
Other student study effort:	
• Lecture: preview/review of notes; homework/assignment; preparation for test/quizzes	36 Hours
• Tutorial/Laboratory/Practice Classes: preview of materials, revision and/or reports writing	30 Hours
Total student study effort:	**105 Hours**

Reading List and References	**Reference Books:** 1. Raj Kamai, *Embedded Systems: Architecture, Programming and Design*, 3rd ed., McGraw-Hill, 2015. 2. Sahar, Ahmad ; Clayton, Craig, *IOS 16 Programming for Beginners : Kickstart Your IOS App Development Journey with a Hands-On Guide to Swift 5. 7 and Xcode 14*, 7th Edition. , Birmingham: Packt Publishing, Limited 2022. 3. Wei-Meng Lee, *Beginning Swift programming*, John Wiley & Sons 2015. 4. Clayton, Craig, SwiftUI Projects, Packt Publishing 2020. 5. J. F. DiMarzio, *Beginning Android programming with Android studio*, Fourth edition, Wrox, a Wiley brand 2017.
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