Title (Units): **COMP4097 Mobile Computing and Internet of Things (3,2,1)**

Course Aims: This course introduces the basic concepts and principles in mobile computing and Internet of Things (IoT). This includes the major techniques involved, and networks & systems issues for the design and implementation of mobile computing systems and applications. This course also provides an opportunity for students to understand the key components and technologies involved and to gain hands-on experiences in building mobile and IoT applications.

Prerequisite: COMP3047 Modern Software Engineering OR COMP3116 Modern Software Engineering OR ITEC3015 Web Development for Data Storytellers

Anti-requisite: ITEC2027 Interactive Media App Development

Course Intended Learning Outcomes (CILOs):
Upon successful completion of this course, students should be able to:

No.	Course Intended Learning Outcomes (CILOs)
	Knowledge
1	Describe the basic concepts and principles in mobile computing on different platforms.
2	Explain IoT systems, focusing on sensor data, communication protocols and how location awareness connects devices to applications.
	Professional Skill
3	Develop a mobile app that is usable, efficient, and secure on more than one device.
4	Demonstrate proficiency in collaborative mobile app development, including UX design, coding practices, and the use of version control.
5	Build a sensor-driven mobile application capable of logging data on a remote server.

Calendar Description: This course introduces the basic concepts and principles in mobile computing and Internet of Things (IoT). This includes the major techniques involved, and networks & systems issues for the design and implementation of mobile computing systems and applications. This course also provides an opportunity for students to understand the key components and technologies involved and to gain hands-on experiences in building mobile and IoT applications.

Teaching and Learning Activities (TLAs):

CILOs	Type of TLA
1, 2, 5	Students will acquire the knowledge about mobile computing and IoT via lectures and discussion on selected topics.
3, 4	Student will acquire the skill to design and implement mobile and IoT applications through lab sessions, software demonstration, programming & written assignment.

Assessment:

No.	Assessment Methods	Weighting	CILOs to be addressed	Description of Assessment Tasks
1	Written and laboratory assignments	30%	1 - 5	Written and laboratory assignments are designed to evaluate the students understanding of the principles and practice of mobile and IoT systems, as well as the design and implementation of mobile and IoT applications
2	Project	30%	1 - 5	Project is designed to evaluate the students understanding of the design and implementation of mobile and IoT applications
3	Examination	40%	1 - 5	Final examination questions are designed to assess students understanding of the methodology, characteristics and techniques about mobile

				computing and its applications, as well as the design and implementation of mobile applications.

Assessment Rubrics:

Excellent (A)	Excels in all tasks: delivers precise documentation with thorough analysis of mobile computing principles and clear IoT system architecture with protocols (CILOs 1–2); builds a robust mobile and sensor-driven application using version control, with excellent UX design and coding practices (CILOs 3–5); submits insightful reflections demonstrating deep understanding of collaborative development and device integration (CILOs 3–4); excels in exam, accurately describing and applying mobile and IoT concepts, including platforms, sensors, APIs, and location awareness (CILOs 1–5). Work is professional and error-free.
Good (B)	Strong performance: provides clear documentation with solid analysis of mobile computing principles and IoT architecture, with minor gaps (CILOs 1–2); builds a functional mobile application with good UX design and coding practices using version control, with slight issues (CILOs 3–5); submits clear reflections reflecting good understanding of collaborative development and integration, with minor inconsistencies (CILOs 3–4); performs well in exam, with minor errors in applying concepts (CILOs 1–5). Work is clear but less innovative.
Satisfactory (C)	Adequate performance: produces basic documentation with partial analysis of mobile computing principles and functional IoT architecture, with moderate gaps (CILOs 1–2); builds a working mobile application with basic UX design and coding practices using version control (CILOs 3–5); submits adequate reflections with basic understanding of collaborative development and integration (CILOs 3–4); passes exam with basic knowledge, with moderate errors (CILOs 1–5). Work lacks depth.
Marginal Pass (D)	Minimal performance: delivers incomplete documentation with vague analysis of mobile computing principles and weak IoT architecture (CILOs 1–2); builds a partially functional mobile application with inconsistent UX design and coding practices (CILOs 3–5); submits weak reflections with limited understanding of collaborative development and integration (CILOs 3–4); struggles in exam, with significant errors (CILOs 1–5). Work has major gaps.
Fail (F)	Fails to meet expectations: produces incorrect or missing documentation (CILOs 1–2); delivers non-functional or incomplete mobile application with poor UX design and coding practices (CILOs 3–5); submits inadequate or missing reflections (CILOs 3–4); fails exam, unable to describe or apply concepts (CILOs 1–5). Work is unprofessional.

Course Content and CILOs Mapping:

Content		**CILO No.**
I	Mobile Development Foundations	1,3-5
II	App Development – UI and API Integration	1-4
III	Internet of Things (IoT) and Device Communication	2-5

References:

• Simon Ng, "Mastering SwiftUI for iOS 18 and Xcode 16: Learn how to Build iOS apps with Swift and SwiftUI", AppCoda Limited, 2024
• Dan Clark, "The Azure IoT Handbook: Develop IoT solutions using the intelligent edge-to-cloud technologies", Packt Publishing, 2023
• V. O. Oner, "Developing IoT Projects with ESP32: Unlock the full Potential of ESP32 in IoT development to create production-grade smart devices", Birmingham, England: Packt Publishing, 2021.

Course Content:

Topic

I. Mobile Development Foundations
   A. Native vs. Cross-Platform Development
   B. Introduction to mobile programming environments
   C. Overview of mobile programming languages and their key features

II. App Development – UI and API Integration
   A. User interface design
   B. Accessing data and services through APIs
   C. Location-aware applications

III. Internet of Things (IoT) and Device Communication
   A. IoT Fundamentals – Introduction to sensors and connected devices
   B. Communication Protocols (e.g., MQTT and WebSockets) for device interaction
   C. Sensor-Driven Apps – Developing applications that collect and display data from IoT devices