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: COMP2045 Programming and Problem Solving AND
COMP2046 Problem Solving Using Object Oriented Approach
OR
COMP3015 Data Communications and Networking

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	Relate general networking competence to integrated solutions in the Internet of Things considering security and privacy aspects and the impact of solutions on citizens and society.
	Professional Skill
3	Develop a mobile app that is usable, efficient, and secure on more than one device.
4	Collaborate in the creation of an interesting and relevant mobile app based on user experience design, functionality, and security analysis. And with the use of standard libraries, unit testing tools, and collaborative version control.
5	Present the analysis of a mobile industrial system with a focus on the security vulnerabilities.

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. Students should understand the important issues and concerns on security and privacy via lectures and discussion on selected articles.
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, techniques, issues and concerns about mobile computing and its applications, as well as the design and implementation of mobile applications

Assessment Rubrics:

	Excellent (A)	**Good (B)**	**Satisfactory (C)**	**Marginal Pass (D)**	**Fail (F)**
Describe the basic concepts and principles in mobile computing	Fully understand all the concepts and principles	Understand most of the concepts and principles	Sufficiently understand the concepts and principles	Understand a minimum set of concepts and principles	Do not understand most of the concepts and principles
Explain the structure and components mobile and IoT systems	Fully understand the structure and components of mobile and IoT systems	Understand most of the structure and components of mobile and IoT systems	Sufficiently understand the structure and components of mobile and IoT systems	Understand a minimum set of the structure and components of mobile and IoT systems	Do not understand most of the structure and components of mobile and IoT systems
Describe the important issues and concerns on security and privacy in IoT and mobile systems	Fully understand all the issues and concerns on security and privacy	Understand most of the issues and concerns on security and privacy	Sufficiently understand the issues and concerns on security and privacy	Understand a minimum set of the issues and concerns on security and privacy	Do not understand most of the issues and concerns on security and privacy
Design and implement mobile applications	Able to design and implement complex mobile applications	Able to design and implement mobile applications	Able to design and implement most of the common mobile applications	Able to design and implement some of the common mobile applications location-aware computing	Not able to design or implement mobile applications aware computing

Course Content and CILOs Mapping:

Content		**CILO No.**
I	Mobile Computing & Internet of Things	1-2
II	Mobile Application Development, Design and Practices	3 - 5

References:

- P. Lea, IoT and Edge Computing for Architects: Implementing edge and IoT systems from sensors to clouds with communication systems, analytics, and security, 2nd Edition, 2nd ed. Birmingham, England: Packt Publishing, 2020.
- C. Clayton, SwiftUI Projects: Build six real-world, cross-platform mobile applications using Swift, Xcode 12, and SwiftUI. Birmingham, England: Packt Publishing, 2020.
- N. Smyth, SwiftUI Essentials - iOS 14 Edition: Learn to Develop iOS Apps using SwiftUI, Swift 5 and Xcode 12. Payload Media, 2020.
- T. Balint, D. Buketa, and Raywenderlich Tutorial Team, *Jetpack compose by tutorials (first edition): Building beautiful UI with jetpack compose. Razeware, 2021*.

Course Content:

Topic

I. Mobile Computing & Internet of Things

A. Use cases of Internet of Things (IoT) and edge computing
B. Sensor technologies
C. Communication technologies and theories
D. Wireless personal area network
E. 802.11 networks
F. Principles of cellular networks
G. Edge computing

II. Mobile Application Development, Design and Practices
A. Mobile platform constraints, performance / power tradeoffs
B. Location-aware applications and positioning technologies
C. Overview of mobile platform languages (e.g., Swift, Kotlin)
D. Programming via mobile platform APIs
E. Software testing for mobile applications
F. Security and privacy issues in mobile systems.