Subject Description Form

Subject Code	COMP4342
Subject Title	Mobile Computing
Credit Value	3
Level	4
Pre-requisite / Co-requisite / Exclusion	**Pre-requisite**: COMP2411 and COMP2432/COMP1411
Objectives	The objectives of this subject are to: 1. learn about the concepts and principles of mobile computing; 2. explore both theoretical and practical issues of mobile computing; and 3. develop skills of finding solutions and building software for mobile computing applications.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: *Professional/academic knowledge and skills* (a) show in-depth understanding of the concepts and features of mobile computing technologies and applications; (b) have a good understanding of how the underlying wireless and mobile communication networks work, their technical features, and what kinds of applications they can support; (c) analyse the important issues of developing mobile computing systems and applications and generate innovative solutions; (d) organise the functionalities and components of mobile computing systems into different layers and apply various techniques for realizing the functionalities; (e) develop mobile computing applications by analysing their characteristics and requirements, selecting the appropriate computing models and software architectures, and applying standard programming languages and tools; (f) organise and manage software built for deployment and demonstration; *Attributes for all-roundedness* (g) analyse requirements and solve problems using systematic planning and development approaches; (h) search for and read critically the information required in solving problems; (i) write and present technical survey papers in well-organised and logical manner; and

	(j) work in teams and collaborate with classmates.
Subject Synopsis/ Indicative Syllabus	**Topic**
	1. Overview of Mobile Computing
	Motivations, concepts, challenges, and applications of mobile computing; relationship with distributed computing, Internet computing, ubiquitous/pervasive computing; Mobile computing models and architectures.
	2. Wireless Networks
	Wireless communication concepts; classification of wireless networks: Cellar networks (1G, 2G, 3G, 4G, 5G), WLAN, WPAN, WMAN, Satellite networks.
	3. Mobile Device Platforms
	Mobile devices; mobile OS (Android, iOS, Windows Mobile and .Net Framework).
	4. Wireless Mobile Internet
	Wireless Internet architecture; Wireless gateway; Wireless application server; Synchronisation server; Messaging server; Mobile Internet proxy services (transcoding, caching); Data dissemination; Disconnected operations (hording).
	5. Mobile Ad Hoc Networks
	Concepts and applications; routing in mobile ad hoc networks; sensor networks, mobile peer-to-peer computing.
	6. Mobility Management
	Handoff and location management concepts; mobility management in PLMN; mobility management in WLAN; mobility management in mobile agent systems; adaptive location management methods.
	7. Location-Based Services
	LBS applications; mobile positioning techniques; GIS; LBS architecture and protocols.

Tutorials / Laboratory Experiment:

Topic	Duration of Laboratory
1. Tutorials	7 Hrs.
2. Labs: Android Programming	6 Hrs.

Teaching/ Learning Methodology	The subject includes lectures, tutorials, and labs. During lectures, the fundamental concepts and principles of mobile computing together with the challenging issues in system design and application development will be introduced. Discussion on various topics related to mobile computing will also be conducted. The labs serve the purpose of training the students to apply the knowledge and technical skills learnt to develop applications, by using trendy programming platforms. Students are also encouraged to learn through self-study and team work.

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed									
		a	b	c	d	e	f	g	h	i	j
Continuous Assessment	**55%**										
1. Assignments		✓	✓	✓					✓	✓	
2. Lab Exercises						✓	✓				
3. Project					✓	✓	✓	✓	✓	✓	✓
4. Mid-term		✓	✓	✓				✓			
Examination	**45%**	✓	✓	✓	✓	✓		✓			
Total	100%										

Assignments include individual an individual work on writing survey report and a group project on developing mobile computing applications. Together with the tutorial and lab sessions, they will be used to assess students' ability and skills to develop innovative applications and conduct survey on current trend of technology. Through group project, report writing and presentation skills will also be assessed. The mid-term and final exams are used to assess the students' understanding, critical thinking, and problem solving abilities.

Student Study Effort Expected	Class contact:	
	▪ Lectures	26 Hrs.
	▪ Tutorials/Lab	13 Hrs.
	Other student study effort:	
	▪ Assignments, Reading, Project, Exams	66 Hrs.
	Total student study effort	105 Hrs.

Reading List and References

Textbooks:

No particular textbook. Reference books and articles will be used.

Reference Books:

1. Schiller, Jochen, *Mobile Communications*, 2nd Edition, Pearson Education, 2003.

2. Mallick, Martyn, *Mobile and Wireless Design Essentials*, Wiley Publishing, 2003.

3. Kwok, Yu-Kwong Ricky and Lau, Vincent K. N., *Wireless Internet and Mobile Computing: Interoperability and Performance*, Wiley-IEEE Press, 2007. (Google Book)

	4.	Agrawal, Dharma P. and Zeng, Qing-An, *Introduction to Wireless and Mobile Systems*, 2nd Edition, Thomson Learning, 2006.
	5.	B'Far, Reza, *Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML*, Cambridge University Press, 2005.
	6.	Kamal, Raj, *Mobile Computing*, 2nd Edition, Oxford University Press, 2012.