

Subject Description Form

Subject Code	COMP437
Subject Title	Mobile Computing
Credit Value	3
Level	4
Pre-requisite / Co-requisite/ Exclusion	Pre-requisite: COMP304 (not applicable for 61025), COMP307 (for 61025), COMP311 (not applicable for 61025) Co-requisite/Exclusion: Nil
Objectives	<ul style="list-style-type: none"> • To learn about the concepts and principles of mobile computing; • To explore both theoretical and practical issues of mobile computing; • To develop skills of finding solutions and building software for mobile computing applications.
Intended Learning Outcomes	<p>Upon completion of the subject, students will be able to:</p> <p><u>Professional/academic knowledge and skills</u></p> <p>(a) grasp the concepts and features of mobile computing technologies and applications;</p> <p>(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;</p> <p>(c) identify the important issues of developing mobile computing systems and applications;</p> <p>(d) organize the functionalities and components of mobile computing systems into different layers and apply various techniques for realizing the functionalities;</p> <p>(e) develop mobile computing applications by analyzing their characteristics and requirements, selecting the appropriate computing models and software architectures, and applying standard programming languages and tools;</p> <p>(f) organize and manage software built for deployment and demonstration.</p> <p><u>Attributes for all-roundedness</u></p> <p>(g) analyze requirements and solve problems using systematic planning and development approaches;</p> <p>(h) search for and read critically the information required in solving problems;</p> <p>(i) write and present technical survey papers in well-organized and logical manner;</p>

(j) work in teams and collaborate with classmates.

Alignment of Programme Outcomes:

Programme Outcome 1: Enable students to practice their writing skills with project document and report writing.

Programme Outcome 4: Develop student critical thinking through class discussion, lab exercises on solving problems and programming, and project.

Programme Outcome 5: Train students in problem solving with programming skills through lab exercise and project with proper design and implementation.

Programme Outcome 7: Enable students to engage in team work with group-based project and to practice team spirit.

**Subject Synopsis/
Indicative Syllabus**

Topic
<p>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.</p>
<p>2. Wireless networks Wireless communication concepts; classification of wireless networks: Cellar networks (1G, 2G, 3G, 4G), WLAN, WPAN, WMAN, Satellite networks;.</p>
<p>3. Mobile device platforms Mobile devices; mobile OS; J2ME, Windows Mobile and .Net Framework, BREW</p>
<p>4. Wireless Mobile Internet Wireless Internet architecture; Wireless gateway; Wireless application server; Synchronization server; Messaging server; Mobile Internet proxy services (transcoding, caching); Data dissemination; Disconnected operations (hording).</p>
<p>5. Mobile ad hoc networks Concepts and applications; routing in mobile ad hoc networks; sensor networks, mobile peer-to-peer computing</p>
<p>6. Mobility management Handoff and location management concepts; mobility management in PLMN; mobility management in mobile Internet; mobility management in mobile agent systems; adaptive location management methods.</p>
<p>7. Location-based services LBS applications; mobile positioning techniques; GIS; LBS architecture and protocols.</p>

Tutorials / Laboratory Experiment:

Topic
1. Tutorials
2. Labs

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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.																																																																																										
Assessment Methods in Alignment with Intended Learning Outcomes	<table border="1"> <thead> <tr> <th rowspan="2">Specific assessment methods/tasks</th> <th rowspan="2">% weighting</th> <th colspan="10">Intended subject learning outcomes to be assessed (Please tick as appropriate)</th> </tr> <tr> <th>a</th> <th>b</th> <th>c</th> <th>d</th> <th>e</th> <th>f</th> <th>g</th> <th>h</th> <th>i</th> <th>j</th> </tr> </thead> <tbody> <tr> <td>1. Assignments</td> <td rowspan="4">55%</td> <td>✓</td> <td>✓</td> <td>✓</td> <td></td> <td></td> <td></td> <td></td> <td>✓</td> <td>✓</td> <td></td> </tr> <tr> <td>2. Lab exercises</td> <td></td> <td></td> <td></td> <td></td> <td>✓</td> <td>✓</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>3. Project</td> <td></td> <td></td> <td></td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>4. Mid-term</td> <td>✓</td> <td>✓</td> <td>✓</td> <td></td> <td></td> <td></td> <td>✓</td> <td></td> <td></td> <td></td> </tr> <tr> <td>5. Examination</td> <td>45%</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td></td> <td>✓</td> <td></td> <td></td> </tr> <tr> <td>Total</td> <td>100 %</td> <td colspan="10"></td> </tr> </tbody> </table> <p>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.</p>	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)										a	b	c	d	e	f	g	h	i	j	1. Assignments	55%	✓	✓	✓					✓	✓		2. Lab exercises					✓	✓					3. Project				✓	✓	✓	✓	✓	✓	✓	4. Mid-term	✓	✓	✓				✓				5. Examination	45%	✓	✓	✓	✓	✓		✓			Total	100 %										
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Reading List and References	<p>Textbooks:</p> <p>No particular textbook. Reference books and articles will be used.</p>																																																																																										

Reference Books:

1. Martyn Mallick, "Mobile and Wireless Design Essentials", Wiley Publishing, 2003.
2. Yu-Kwong Ricky Kwok, Vincent K.N. Lau, "Wireless Internet and Mobile Computing: Interoperability and Performance", Wiley-IEEE Press, 2007. (Google Book)
3. D.P. Agrawal and Q.-A. Zeng, "Introduction to Wireless and Mobile Systems", 2nd edition, Thomson Learning, 2006.
4. Reza B'Far, "Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML", Cambridge University Press, 2005.
5. J. Schiller, "Mobile Communications", 2nd edition, Pearson Education, 2003.