Subject Description Form

Subject Code	EIE4103
Subject Title	Mobile Computer System Architecture
Credit Value	3
Level	4
Pre-requisite	EIE2211 Logic Design or EIE2105 Digital and Computer Systems
Co-requisite/ Exclusion	Nil
Objectives	This course aims at providing students with an understanding of the hardware architecture of mobile computing systems and the techniques essential to their design and implementations.
Intended Subject Learning Outcomes	**Upon completion of the subject, students will be able to:** Category A: Professional/academic knowledge and skills 1. Understand the hardware architecture of mobile computers. 2. Understand the functions and features of different sub-systems of a mobile computer. 3. Understand the design constraints of 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. Mobile Computers and Their Applications Mobile computers and their applications in daily life. Complex systems and microprocessors. The embedded system design process. Formalisms for system design. 2. Instruction Sets ARM processor – Processor and memory organization, data operations, flow of control. TIC55x DSP – Processor and memory organization, data operations, flow of control. 3. Central Processing Units Programming input and output. Supervisor mode, exceptions, and traps. Co-processors. Memory system mechanisms. CPU performance. CPU power consumption. Design example. 4. Bus-Based Computer Systems The CPU bus. Memeory devices. I/O devices. Component interfacing. Designing with microprocessors. Development and debugging. System-level performance analysis. Design example. 5. Multiprocessors Why multiprocessors? CPUs and accelerators. Multiprocessor performance analysis. Consumer electronics architecture. Design examples: cell phones, compact DISC and DVD players, audio players, digital still cameras, video accelerator etc. 6. Networks Distributed embedded architectures. Networks for embedded systems. Network-based design. Internet-enabled systems. Vehicles as networks. Sensor networks. Design example.

<table>
<tr><td></td><td>7. <u>3D Graphics on Embedded Systems</u>
Principle of mobile 3D graphics system design. Mobile 3D graphics APIs. Mobile 3D graphics SoC. Real chip implementations.</td></tr>
<tr><td>Teaching/Learning Methodology</td><td>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 1, 2, and 3, the open-ended questions in laboratory exercises and assignments will provide the chance to students to exercise their creatively in problem solving.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Subject Learning Outcomes</td><td>
<table>
<tr><th rowspan="2">Specific Assessment Methods/Tasks</th><th rowspan="2">% Weighting</th><th colspan="4">Intended Subject Learning Outcomes to be Assessed (Please tick as appropriate)</th></tr>
<tr><th>1</th><th>2</th><th>3</th><th>4</th></tr>
<tr><td>1. Continuous Assessment (total: 50%)</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>• Homework and assignments</td><td>16%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>• Tests</td><td>18%</td><td>✓</td><td>✓</td><td>✓</td><td></td></tr>
<tr><td>• Laboratory exercises</td><td>16%</td><td></td><td></td><td>✓</td><td>✓</td></tr>
<tr><td>2. Examination</td><td>50%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Total</td><td>100%</td><td colspan="4"></td></tr>
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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.

Examination and tests: They assess students’ achievement of the learning outcomes more rigorously.</td></tr>
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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/examination	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 Book:** 1. W. Wolf, *Computers as components: Principles of embedded computing system design*, 2nd ed., Morgan Kaufmann, 2008. 2. J.H. Woo, J.H. Sohn, B.G. Nam and H.J. Yoo, *Mobile 3D graphics SoC: From algorithm to chip*, John Wiley & Sons, 2010.	
Last Updated	May 2018	
Prepared by	Dr Chris Chan	