Subject Description Form

Subject Code	COMP212
Subject Title	Computer Organization and Systems
Credit Value	3
Level	2
Pre-requisite / Co-requisite/ Exclusion	Pre-requisite/Co-requisite: Nil Exclusion: COMP208
Objectives	This subject is designed to provide students with an introductory but comprehensive knowledge on computer systems, computer organization, computer system architecture and assembly language programming.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: *Professional/academic knowledge and skills* (a) understand the organization of a modern computer system and be able to relate them to real examples implemented in commercially successful products; (b) understand the internal organization of a computer system through practicing with an assembly language; (c) apply concepts and skills to solve real life problems using a low level programming language. *Attributes for all-roundedness* (d) provide framework for thinking about computer organization; (e) continue the lifetime learning necessary for staying at the forefront of computing systems development. **Alignment of Programme Outcomes:** Programme Outcome 2: This subject contributes to enhance the student's horizon in knowing the modern computer system and how they could be applied to solve real-life problems. Programme Outcome 4: This subject contributes to developing student critical thinking through tutorial and lab exercises. They will also practice more in written assignments and programming exercises. Programme Outcome 5: This subject contributes to problem solving with simple programming in assembly language in lab exercises, and to solve tutorial and assignment questions.

	Programme Outcome 6: This subject contributes to make the student to feel and follow the state-of-the-art technology evolution. It is challenging to follow the rapid evolution of computer systems, including computer architecture and see how they are related to the industry.
Subject Synopsis/ Indicative Syllabus	

Topic	Duration of Lectures
1. Overview of computer systems Introduction to Information Technology; concepts of a digital system; overview of computer system structures; computer evolution and performance; different types of computer systems.	5
2. Memory, I/O and storage devices Input and output devices; interconnecting system components; interfacing; buses; interrupts in I/O systems; standard bus interfaces; main memory; RAM; ROM; secondary storage; cache memory; virtual memory and operating systems support.	7.5
3. Computer arithmetic Number systems; decimal system; binary system and arithmetic; octal and hexadecimal systems; BCD representation; conversion between representations; floating point representations.	5
4. Boolean Algebra and logic networks Boolean algebra and networks; basic logical operations; derivation of logical expressions; logic gates; flip-flops; counters; half and full adders.	7.5
5. CPU and assembly language Instruction sets, characteristics and functions; CPU structure and functions; reduced instruction set computers; assembler commands; program instructions; assembler and execution of programs; assembly language programming.	10
Total	**35**

Teaching/Learning Methodology	Lectures teach students on the main concepts of the course, together with comprehensive examples, and class questions and answers for easy understanding. Tutorials and lab sessions offer the opportunity for students to review the lecture materials through online exercises and also the use of programming tools to learn to program. Programming assignments will give students the opportunity to solve problems through implementation where they understand and practice on how programs can be written and compiled to run to complete certain tasks. Homework assignments help students to develop analytical and problem solving skills.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c	d	e	
1. Homework Assignments	55%	✓			✓		
2. Online QA exercises		✓			✓		
3.Programming Assignments		✓	✓	✓	✓	✓	
4. Hour exams (quizzes)		✓	✓		✓		
5. Examination	45%	✓	✓		✓		
Total	100 %						

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

All five items are relevant to the assessment of (a) understand the organization of a modern computer system and be able to relate them to real examples implemented in commercially successful products and(d) provide framework for thinking about computer organization;

Programming exercises in assignments are used to assess programming skills in (b) understand the internal organization of a computer system through practicing with an assembly language; and (c) apply concepts and skills to solve real life problems using a low level programming language. The Programming stills learn can also help student in (e) continue the lifetime learning necessary for staying at the forefront of computing systems development and programming skills(no matter what the actual language is used) can help students to learn other programming languages.

The Quizzes and the examination are also used to assess the programming skills learnt (for items b, c).

Student Study Effort Required

Class contact:	
▪ Lecture	35 Hrs.
▪ Laboratory	14 Hrs.
Other student study effort:	
▪ Reading to understand the concepts	30 Hrs.
▪ Homework and Programming Assignments, online QA, and preparation for Quizzes and Final exam	28 Hrs.

	Total student study effort	107 Hrs.
Reading List and References	**Textbooks:** 1. Stallings, W., Computer Organization and Architecture: Designing for Performance, Sixth Edition, Prentice Hall, 2003. **Reference Books:** 1. Mano, M.M. and Kime, C.R., Logic and Computer Design Fundamentals, Second Edition, Prentice Hall, 2000. 2. Hamacher, C., Vranesic, Z. and Zaky, S., Computer Organization, Fifth Edition, McGraw-Hill, 2002. 3. David A. Patterson and John L. Hennessy, Computer Organization and Design: The Hardware/Software Interface, Third Edition, Morgan Kaufmann, 2005. 4. Barry B. Brey, The Intel Microprocessors: 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium, Pentium Pro, and Pentium II Processors: Architecture, Programming, and Interfacing, Sixth Edition, Prentice Hall, 2003. 5. Antonakos, J.L., The 68000 Microprocessor, Fourth Edition, Prentice Hall, 1999.	