Subject Description Form

Subject Code	COMP2432
Subject Title	Operating Systems
Credit Value	3
Level	3
Pre-requisite / Co-requisite / Exclusion	**Pre-requisite**: COMP2011
Objectives	The objectives of this subject are to: • introduce to students about the different types of services provided by operating systems; • equip students with knowledge and understanding on the concepts and theories of operating systems; and • equip students with skills on the implementation issues of operating systems.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: *Professional/academic knowledge and skills* (a) identify the services provided by operating systems; (b) understand the internal structure of an operating system and be able to write programs using system calls; and (c) understand and solve problems involving key concepts and theories in operating systems, including process control, mutual exclusion, deadlock and synchronization. *Attributes for all-roundedness* (d) develop skills in problem solving using systematic approaches; and (e) solve complex problems in groups and develop group work.

Subject Synopsis/ Indicative Syllabus	**Topic** **1. Introduction to Operating Systems** Types and functionalities of operating systems; system components and services; resource management. **2. Unix and Linux** Usage of Unix and Linux; shell and commands; scripts; system calls. **3. Process Management** Process concepts; process manipulation; asynchronous concurrent processes; process communication; mutual exclusion; synchronization; deadlock; scheduling algorithms. **4. Memory and Secondary Storage Management** Virtual memory; paging and segmentation system; secondary storage allocation; directory and file system structure. **5. Protection and Security** Protection and access control; capabilities; security and cryptography. **6. Case Studies on Operating Systems** Structure of Unix, Linux, Mac OS, Windows 7, etc.
Teaching/ Learning Methodology	During the lectures, students will come across the common concepts and theories in operating systems. Those concepts and theories would be explained with reference to real operating systems such as Unix and Linux. Case studies on those operating systems would be provided. During the laboratories, students will have to practice the OS usage and concepts, via programming with different system calls and scripts to achieve the learning effect. During the tutorials, students will have the opportunity to practice and apply what they have learned during the lecture to reinforce their knowledge. Written and programming assignments let students apply their knowledge to solve problems. The group project provides the students an environment to work together for a bigger problem and to stimulate learning from peers.

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
Continuous Assessment	**55%**	✓	✓	✓	✓	✓
Examination	**45%**	✓	✓	✓	✓	
Total	100%					

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

The course will be accessed by assignments, project, test and examination.

Assignments are designed to reinforce the concepts and algorithms learned in the lecture and laboratory, by solving bigger problems. Project is used to develop students' analytic and problem solving skills by implementing a significant piece of software. Test and examination are used to assess independent problem solving and critical thinking skills.

Student Study Effort Expected

Class contact:	
▪ Lecture	39 Hrs.
▪ Tutorial/Lab	13 Hrs.
Other student study effort:	
▪ Assignments, Projects, Self-study, Test and Exam Preparation	53 Hrs.
Total student study effort	105 Hrs.

Reading List and References

Textbook:

1. Silberschatz, A., Galvin, P.B. and Gagne, G., *Operating System Concepts*, 8th Edition, John Wiley and Sons, 2009.

Reference Books:

1. Elmasri, E., Carrick, A.G. and Levine, D., *Operating Systems: A Spiral Approach*, McGraw Hill, 2010.
2. Dhamdhere, D.M., *Operating Systems: A Concept-based Approach*, 2nd Edition, McGraw Hill, 2006.
3. Diaz, C., *Introduction to Unix/Linux*, Thomson, 2007.
4. Robbins, K.A., *Unix Systems Programming*, Prentice Hall, 2003.