Subject Description Form

Subject Code	COMP 2432
Subject Title	Operating Systems
Credit Value	3
Level	2
Pre-requisite / Co-requisite / Exclusion	Prerequisites: COMP 2011
Objectives	The objective of this subject is to: 1. introduce to students about the different types of services provided by operating systems; 2. equip students with knowledge and understanding on the concepts and theories of operating systems; and 3. 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; (c) understand and solve problems involving key concepts and theories in operating systems, including process control, communication, memory management, deadlock and synchronisation; *Attributes for all-roundedness* (d) develop skills in problem solving; and (e) solve problems in groups and develop group work.
Subject Synopsis/ Indicative Syllabus	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; interrupts; kernel; system calls. 3. **Process management** Process concepts; process creation and termination; concurrent processes; process scheduling.

	4. **Process communication and synchronisation**
	Inter-process communication; critical section problem; synchronisation; deadlock.
	5. **Memory management**
	Address translation; memory allocation; paging and segmentation system; virtual memory.
	6. **File systems, protection and security**
	Directory and file system structure; secondary storage; protection and access control; capabilities; security and threats.
	7. **Case studies on operating systems**
	Structure of Unix, Linux, Mac OS, Windows 10, 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				
		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:	
	▪ Lectures	39 Hrs.
	▪ Tutorials / Labs	13 Hrs.
	Other student study effort:	
	▪ Assignments, project, self-study, test and exam preparation	68 Hrs.
	Total student study effort	120 Hrs.
Reading List and References	**Textbook:** 1. Silberschatz, A., Galvin, P.B. and Gagne, G., *Operating System Concepts*, 10/E, John Wiley and Sons, 2018. **Reference Books:** 1. Elmasri, E., Carrick, A.G. and Levine, D., *Operating Systems: A Spiral Approach*, McGraw Hill, 2010. 2. McHoes, A.M. and Flynn, I.M., *Understanding Operating Systems*, 8/E, Thomson, 2018. 3. Dhamdhere, D.M., *Operating Systems: A Concept-based Approach*, 2/E, McGraw Hill, 2006. 4. Fox, R.I., *Linux with Operating System Concepts*, CRC Press/Taylor & Francis Group, 2015. 5. Diaz, C., *Introduction to Unix/Linux*, Thomson, 2007.	