

1.	Name of Course/Module	Operating Systems	
2.	Course Code	TOS2461	
3.	Status of Subject	Core for B.IT Security Technology	
4.	MQF Level/Stage	Bachelor Degree – MQF Level 6	
5.	Version (state the date of the last Senate approval)	June 2012	
6.	Requirement for Registration	None	
7.	Name(s) of academic/teaching staff	Leow Meng Chew Asrul Hadi b Yaacob Jaya Kumar	
8.	Semester and Year offered	Trimester 1 (Beta Level)	
9.	Objective of the course/module in the programme :		
	To introduce the main components of a typical operating system and the services that it provides.		
10.	Learning Outcomes :		
	At the completion of the subject, students should be able to:		
	LO1: Identify the basic components of general operating systems. (Cognitive, Level 1)		
	LO2: Compare and contrast various operating system mechanisms and operations. (Cognitive, Level 4)		
	LO3: Analyze specific problem likely to occur in a component of an operating system (e.g., memory allocation and deadlock handling). (Cognitive, Level 4)		
	LO4: Demonstrate skills in installing and operating an operating system. (Psychomotor, Level 3)		
11.	Synopsis:		
	This subject deals with the important aspects of a computer operating system, including processes, scheduling algorithms, and memory management. Concepts such as deadlocks, memory management, and file management are detailed.		
	Kursus ini menerangkan fungsi sistem operasi di dalam menguruskan perisian komputer.		
12.	Mapping of Subject to Programme Outcomes :		
	Programme Outcomes		% of Contribution
	PO1: Apply soft skills in work and career related activities		50.00
	PO2: Demonstrate knowledge and understanding of fundamental concepts, principles and best practices		50.00
13.	Assessment Methods and Types :		
	Method and Type	Description/Details	Percentage
	Coursework	Midterm Test (20%) & Assignment (20%)	40.00%
	Final Exam	Written Exam	60.00%
14.	Details of Subject		

Topics	Mode of Delivery	
	Lecture	Tutorial
1. Introduction to Operating Systems Early systems, simple batch systems, multiprogrammed batch systems, time-sharing systems, personal-computer systems, parallel systems, distributed systems, real-time systems.	4	2
2. Computer System Structures Computer systems operation, I/O structure, storage structure, storage hierarchy, hardware protection, general system architecture.	2	1
3. Operating System Structures System components, operating system services, system calls, system programs, system structure, virtual machines, system design and implementation, system generation.	2	1
4. Processes Process concept, process scheduling, operation on a process, cooperating processes, threads, inter process communication.	2	1
5. CPU Scheduling Basic concepts, scheduling criteria, scheduling algorithms, multiprocessor scheduling, real-time scheduling, algorithms evaluation.	2	1
6. Synchronisation The critical section problem, synchronization hardware, classical problems of synchronisation.	4	2
7. Deadlocks System model, deadlock characterization, methods for handling deadlocks, prevention, avoidance, detection, recovery, combined approach.	2	1
8. Memory Management Address space, swapping, contiguous allocation, paging, segmentation, paged segmentation.	4	2
9. Virtual Memory Demand paging, page replacement, page replacement algorithms, frame allocation, thrashing.	2	1

	10.File Systems		2	1
	File concept, access method, directory structure, protection, file system structure, allocation methods, free-space management, directory implementation, efficiency and performance, recovery.			
	11.Secondary Storage Management		2	1
	Disk scheduling. Disk management, swap space management.			
	Total		28	14
15.	Tutorials			
	<ul style="list-style-type: none"> • Multiprogramming • Interrupts • OS Structure • Processes & Threads • CPU scheduling exercises • Deadlock exercises • Memory Management • Paging – page reference strings • File Systems 			
16.	Total Student Learning Time (SLT)	Face to Face (Hour)	Total Guided and Independent Learning	
	Lecture	28	28	
	Tutorials	14	14	
	Assignment	-	12	
	Mid Term Test	1	5	
	Final Exam	2	20	
	Sub Total	45	79	
	Total SLT	124/40 = 3.1 => 3		
17.	Credit Value	3		
18.	Reading Materials :			
	Textbook	Reference Materials		
	Abraham Silberschatz, "Operating Systems Concepts", 5 th Edition, Addison Wesley, 1997.	1. William Stallings, "Operating Systems", 2 nd Edition, Prentice Hall, 1995. 2. Gary Nutt, "Operating Systems - a modern perspective", 2 nd Edition, Addison Wesley, 2000.		
19.	Appendix (to be compiled when submitting the complete syllabus for the programme) :			
	1. Mission and Vision of the University and Faculty 2. Mapping of Programme Objectives to Vision and Mission of Faculty and University 3. Mapping of Programme Outcome to Programme Objectives 4. Programme Objective and Outcomes (Measurement and Descriptions)			