MULTIMEDIA UNIVERSITY®

COURSE INFORMATION

1 .	**Name of Course**	Operating Systems
2 .	**Course Code**	TSN2101
3 .	**Type of Course** (e.g. : Core, major, elective etc.)	Core
4 .	**Synopsis**	This subject is to provide a theoretical background of the operating system with a focus on the design considerations in its implementation.
5 .	**Version** (State the date of theSenate's approval - previous and the current approval date)	Current: January 2018 Previous: June 2016
6 .	**Name(s) of Academic Staff**	Tan Saw Chin, Timothy, Ng Hu
7 .	**Semester and Year Offered**	Trimester 1 (Gamma)
8 .	**Credit Value**	4 Credit hour
9 .	**Pre-Requisite**	None

10 . **Objective of the course in the programme:**

To provide a theoretical background of the operating system with a focus on the design considerations in its implementation

11 . **Justification for including the course in the programme:**

This course prepares students to be familiar with the design and architecture of operating systems so as to allow them to develop systems or applications that may require basic understanding of these principles.

12 . **Course Learning Outcomes (CLO)**

		Domain	Level
CLO1:	Identify the components and concepts of operating systems.	Cognitive	1
CLO2:	Describe the structure and design decisions in the implementation of an operating system	Cognitive	2
CLO3:	Compare the algorithms and operational principles considered in the design of operating systems.	Cognitive	4
CLO4:	Analyze specific problems likely to occur in a component of an operating system	Cognitive	4

13 . **Mapping of the Course Learning Outcomes to the Programme Learning Outcomes, Teaching Methods and Assessment:**

Course Learning Outcomes (CLO) (Must tally with CLOs in item 12)	Programme Learning Outcomes (PLO)												Teaching Methods	Assessment Method
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
CLO1		✓											Lecture/Practical	Test/Final Exam
CLO2		✓	✓	✓									Lecture/Practical	Test/Assignment/Final Exam
CLO3		✓	✓	✓									Lecture/Practical	Quiz/Test/Assignment/Final Exam
CLO4		✓	✓	✓									Lecture/Practical	Test/Final Exam
Total		**4**	**3**	**3**									*Indicate the relevancy between the CLO and PLO by ticking "✓" the appropriate relevant box (This description must be read together with standards 2.1.2, 2.2.1, and 2.2.2 in Area 2 – pages 16 & 18 of COPPA 2.0)*	

14 . **Transferable Skills:**

Critical Thinking and research.

15 . **Distribution of Student Learning Time (SLT)**

	Course Content Outline	**CLO	Teaching and Learning Activities – Guided Learning (F2F)* *L	*T	*P	*O	Guided Learning (NF2F)*	Independent Learning (NF2F)*	Total SLT
1	**Introduction to Operating Systems** Operating system roles and functions, Operating system operations, Introduction to single processor, multiprocessor, networked and distributed operating systems	**1**	2		2			4	8
2	**Operating System Structures** System services, interface and system calls, Kernel organization, Virtualization	**1**	2		2			4	8
3	**Processes and Threads** Concept of processes, Operations on processes, Inter-process communication, Multithreading models, Threading issues.	**2**	3		3			6	12
4	**Process Scheduling** Scheduling criteria, Scheduling algorithms, Thread scheduling, Multipleprocessor scheduling	**2**	3		3			6	12
5	**Process Synchronization** Race conditions, Critical sections and mutual exclusion, Locks and semaphores, Classical problems of synchronization	**2**	2		2			4	8

	6	**Deadlocks** **Deadlock characterization, Deadlock prevention, deadlock avoidance and deadlock detection, Recovery from deadlock**	**3**	2		2			4	8
	7	**Memory Management** **Concept of swapping, Contiguous memory allocation, Paging, Segmentation**	**3**	3		3			6	12
	8	**Virtual Memory** **Demand paging, Copy-on-write, Page replacement. Allocation of frames, Concept of thrashing**	**3**	3		3			6	12
	9	**File Systems** **Concept of files, Access methods, Directory structure, File protection**	**3**	2		2			4	8
	10	**File System Implementation** **File system structure, Directory implementation, Allocation methods, Free space management**	**4**	2		2			4	8
	11	**Secondary Storage Management** **Disk structure and layout, Disk scheduling, Disk management and performance, RAID**	**4**	2		2			4	8
	12	**Operating System Case Studies** **Linux, Windows, Mobile OS**	**4**	2		2			4	8
									Total SLT	**112**

SUMMATIVE ASSESSMENT

1. Continuous Assessment	**Percentage %**	**Total SLT**
Quiz	10%	3
Test	20%	10
Assignment	10%	13
	Total SLT for Continuous Assessment	**26**

2. Final Assessment	**Percentage %**	**Total SLT**	
		F2F	**ILT**
Final Exam	60%	2	20
	Total SLT for Final Assessment (F2F + NF2F)	**22**	
Grand Total	**100%**	**160**	

****Indicate the CLO based on the CLO's numbering in Item 12.**
***L= Lecture, *T= Tutorial, *P= Practical, *O= Others, F2F*= Face to Face, NF2F*= Non Face to Face**

16 . **Identify Special Requirement to Deliver the Course (e.g., software, nursery, computer lab, simulation room): UNIX Command, Virtual Box**

17 . **Main References:**
Silberschatz, A. et al., "Operating Systems Concepts", 9th Edition International Student Version, John Wiley, 2016

18 . **Additional References:**
Stallings, W., "Operating Systems:Internals and Design Principles", 8th Edition, Pearson, 2016

Note:
Cells shaded light grey contain formulas / fixed values. Edit these formulas only if needed.