UNIVERSITI TEKNOLOGI MARA

CSC520: PRINCIPLES OF OPERATING SYSTEMS

Course Name (English)	PRINCIPLES OF OPERATING SYSTEMS APPROVED
Course Code	CSC520

MQF Credit	3

Course Description	The operating system is an essential part of a computer system. Similarly that the need to understand and appreciate the operating system is also indispensable to the computer science students. Operating systems should be studied for the reason of their existence: what they do, how they did it, and how they are designed and constructed.

Transferable Skills	Conceptual Mapping Skill, Managerial Skill, Analytical Skill

Teaching Methodologies	Lectures, Tutorial, Discussion

CLO	CLO1 Describe concepts and components of operating systems CLO2 Display practical skills in operating systems CLO3 Demonstrate teamwork skills in Operating Systems

Pre-Requisite Courses	No course recommendations

Topics

1. Introduction
1.1) What operating system do
1.2) Operating system operations
1.3) Resource management
1.4) Security and protection

2. Operating System Structure
2.1) Operating system services
2.2) User and operating system interface
2.3) System calls and system services
2.4) Operating system design and implementation
2.5) Operating system structure

3. Processes
3.1) Process and thread concept
3.2) Process scheduling
3.3) Operation on processes
3.4) Interprocess communication

4. Threads and Concurrency
4.1) Multithreading models
4.2) Threading issues

5. CPU Scheduling
5.1) Scheduling criteria and algorithms
5.2) Multiprocessor scheduling
5.3) Real-time CPU scheduling

6. Synchronization
6.1) The critical-section problem
6.2) Hardware support for synchronization
6.3) Semaphores
6.4) Monitors
6.5) Classic problems of synchronization

7. Deadlocks
7.1) System model
7.2) Deadlock characterization
7.3) Methods for handling deadlock
7.4) Deadlock prevention, avoidance and detection
7.5) Deadlock recovery

8. Main Memory
8.1) Contiguous memory allocation
8.2) Paging
8.3) Swapping

9. Virtual Memory
9.1) Demand paging
9.2) Page replacement
9.3) Allocation of frames
9.4) Thrashing
9.5) Memory compression

10. I/O Systems
10.1) I/O hardware
10.2) Application I/O interface
10.3) Transforming I/O requests to hardware operations
10.4) Performance

11. File System
11.1) Files concepts and structure
11.2) Access methods
11.3) Directory structure
11.4) File system operations
11.5) Allocation methods
11.6) Free-space management
11.7) Performance and Recovery

12. Current Issues
12.1) any related issues on current operating system

Assessment Breakdown	%
Continuous Assessment	70.00%
Final Assessment	30.00%

Details of Continuous Assessment	Assessment Type	Assessment Description	% of Total Mark	CLO
	Assignment	Assignment	15%	CLO2
	Group Project	Current issues	20%	CLO3
	Online Quiz	Using i-Learn portal. At least 4 times per semester	5%	CLO1
	Presentation	Current issues	10%	CLO3
	Test	Test 1 covers Topic 1 until Topic 6	10%	CLO1
	Test	Test 2 covers Topic 7 until Topic 11	10%	CLO1

Reading List	Recommended Text	Silberschatz, A., Calvin, P.A., Gagne, G. 2018, *Operating System Concepts*, 10 Ed., John Wiley and Son Inc. [ISBN: 978-1118063]
	Reference Book Resources	Dhamdhere, D. 2017, *Operating System A Concept based Approach*, 3 Ed., McGraw-Hill [ISBN: 9781259005589]
		Anderson, T. & Dahlin, M. 2014, *Operating Systems: Principles and Practice*, 2 Ed., Recursive Books [ISBN: 978-09856735]
		McHoes, A. M. & Flynn, I. M 2013, *Understanding Operating Systems*, 5 Ed., Cengage Learning [ISBN: 978-12850965]
		Tanenbaum, Andrew S. 2014, *Modern Operating Systems*, 4 Ed., Prentice-Hall [ISBN: 978-01335916]
		Holcombe, J. & Holcombe, C. 2014, *Survey of Operating Systems*, 4 Ed., McGraw-Hill Education [ISBN: 978-007351818]
		Garg, R. & Verma, G. 2017, *Operating Systems: A Modern Approach*, Mercury Learning & Information [ISBN: 9781942270386]
		Stalling, W. 2018, *Operating Systems: Internals and Design Principles*, 9 Ed., Pearson [ISBN: 978-013467095]
Article/Paper List	This Course does not have any article/paper resources	
Other References	This Course does not have any other resources	