



COURSE OUTLINE

Course Title	:	Operating System (<i>Sistem Pengoperasian</i>)
Course Code	:	CCS3300
Credit	:	3 (2+1)
Contact Hours	:	2 hours and 1 hour of lecture & per week
Total Learning Hours	:	120
Semester	:	Semester I 2025/2026
Prerequisite	:	CCS3200
Instructor	:	Assoc. Prof. Ts. Dr. Nur Izura Udzir (Tel: 03-97691708, email: izura@upm.edu.my)

Objectives:

At the end of this course, students are able to:

1. illustrate main modules, architecture and techniques of managing computer resources in operating system. (C4)
(*mengilustrasi modul utama, seni bina dan teknik mengurus sumber komputer dalam sistem pengoperasian.*)
2. develop programs based on algorithms in an operating system. (P4)
(*membina atur cara berdasarkan algoritma dalam sistem pengoperasian.*)
3. report findings of study related to existing operating systems. (A3, CS)
(*melapor dapatan kajian berkaitan sistem pengoperasian sedia ada.*)

Synopsis:

This course covers the main functions and components of modern operating systems. It covers the formal principles of operating systems, process management and scheduling, as well as resource management in computer systems. Non-conventional operating system environments are also discussed.

(*Kursus ini merangkumi fungsi dan komponen utama sistem pengoperasian moden. Ia meliputi prinsip formal sistem pengoperasian, pengurusan dan penjadualan proses, serta pengurusan sumber dalam sistem komputer. Persekutuan sistem pengoperasian bukan-konvensional turut dibincangkan.*)

Course materials: PutraBLAST (<http://learninghub.upm.edu.my/>)

Assessments:

1. Mid-term Test	:	25%
2. Quizzes	:	10%
3. Assignments	:	15%
4. Project	:	10%
5. Group presentation	:	10%
6. Final Examination	:	30%

Tips to print the lecture slides:

- Open menu Print
- Choose to print **Handouts**
- Color/grayscale:
choose **Pure Black & White**

Course Contents:

Topic	Week
Chapter 1: Structure and Operation of Operating Systems <ul style="list-style-type: none"> • Operating-System Structure and Operations • Computer-System Organization and Architecture • Interrupts • Computing Environments • Operating System Services • Microkernels • System Calls • System Programs 	1, 2
Chapter 2: Process Management & Control <ul style="list-style-type: none"> • Process Concept and Elements • Process States • Process Control Block • Multithreading 	3, 4
Chapter 3: Uniprocessor Scheduling <ul style="list-style-type: none"> • Scheduling Criteria • Scheduling Algorithms <ul style="list-style-type: none"> – FCFS, SJF, Round robin, Priority • Multiple-Processor Scheduling <p data-bbox="774 695 992 729">MID-TERM TEST</p>	5, 6
Chapter 4: Concurrency: Synchronization <ul style="list-style-type: none"> • Concurrency • Critical-Section and Mutual Exclusion • Semaphores and Monitors • Classic Problems of Synchronization 	7
Chapter 5: Deadlock <ul style="list-style-type: none"> • Principles of Deadlock • Deadlock Handling Mechanisms - Deadlock Prevention, Avoidance and Detection • Deadlock Recovery 	8
Chapter 6: Memory Management <ul style="list-style-type: none"> • Memory management requirements • Fixed and Dynamic Memory partitioning • Paging and Segmentation • Virtual Memory • Demand Paging and Segmentation • Page Replacement Algorithms 	9, 10
Chapter 7: I/O Management <ul style="list-style-type: none"> • I/O function organization • Kernel I/O Subsystem • I/O Buffering 	11
Chapter 8: Secondary-Storage Management <ul style="list-style-type: none"> • Mass Storage Structure • Disk Scheduling Algorithms <ul style="list-style-type: none"> – FCFS, SSTF, SCAN, LOOK, etc. • RAID Structure • Stable-Storage Implementation <ul style="list-style-type: none"> – Tertiary Storage Devices 	12
Chapter 9: File Management <ul style="list-style-type: none"> • File Organization and Directory • File Sharing, Access and Protection • Record Blocking • File Allocation Methods 	13
Chapter 10: Non-Conventional OS <ul style="list-style-type: none"> • Mobile and Embedded OS • Multi-platform OS • OS Environment for Games 	14

Reference Books:

1. Carswell, R., Freese, T. & Jiang, S. (2017). *Guide to Parallel Operating Systems with Windows 7 and Linux (3rd Edition)*. Stamford: Cengage Learning.
2. Flynn, I.M. & McHoes, A.M. (2018). *Understanding Operating System (8th Edition)*. Belmont: Thomson Course Technology.
3. Silberschatz, A. (2018). *Operating System Concepts (10th Edition)*. Somerset: Wiley & Sons.
4. Stallings, W. (2018). *Operating Systems: Internals and Design Principles (9th Edition)*. Upper Saddle River: Prentice-Hall.
5. Tanenbaum, A.S. & Bos, H. (2015). *Modern Operating Systems (4th Edition)*. Upper Saddle River: Prentice-Hall.