Curtin University

Unit Outline

COMP2006 Operating Systems
Semester 1, 2021

Unit study package code:	COMP2006
Mode of study:	Internal
Tuition pattern summary:	Note: For any specific variations to this tuition pattern and for precise information refer to the Learning Activities section.
	Lecture: 1 x 2 Hours Weekly
	Workshop: 1 x 1 Hours Weekly
	This unit does not have a fieldwork component.
Credit Value:	25.0
Pre-requisite units:	10163 (v.0) Unix and C Programming 120 or any previous version
	OR
	313670 (v.0) Engineering Programming 210 or any previous version
	OR
	COMP1000 (v.0) Unix and C Programming or any previous version
	OR
	CMPE2004 (v.0) Advanced Engineering Programming or any previous version
Co-requisite units:	Nil
Anti-requisite units:	Nil
Result type:	Grade/Mark
Approved incidental fees:	Information about approved incidental fees can be obtained from our website. Visit fees.curtin.edu.au/incidental_fees.cfm for details.

Unit coordinator:	**Title:**	Dr
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	Location:	Building: 314 - Room: 432
Teaching Staff:	**Name:**	Sie Teng Soh
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Administrative contact:	**Name:**	Sie Teng Soh
	Phone:	08 9266 2984
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Learning Management System: Blackboard (lms.curtin.edu.au)

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Acknowledgement of Country

We respectfully acknowledge the Indigenous Elders, custodians, their descendants and kin of this land past and present. The Centre for Aboriginal Studies aspires to contribute to positive social change for Indigenous Australians through higher education and research.

Syllabus

The operating systems are a critical part of any computer systems, and therefore it is important for all computing students to have sufficient knowledge of operating systems that evolve with the development of computer technologies. In this unit students will learn the following main OS components: process, thread, and their communication and synchronizations; CPU scheduling algorithms; deadlock detection, prevention, and avoidance; memory management, including memory allocation, memory paging and segmentation, and virtual memory; file system interface, implementation, and access methods; disk structure, scheduling, management and reliability; I/O management; and protection and security concepts and implementations.

Introduction

Welcome to Operating Systems! In this unit, students will learn the major components of the operating systems. Students will also apply the knowledge they learn in the lectures and workshops to complete the unit's programming assignment.

This unit, in line with current research and university values, strives to achieve a positive and inclusive educational environment. This supports improved academic performance, increased confidence and creates a greater sense of safety and belonging. Your teachingteam is committed to providing a safe and inclusive learning experience and requires students to take reasonable and appropriate measures to actively eliminate discrimination on the basis of ability; cultural and social background; and diverse sex, sexuality, and gender.

Unit Learning Outcomes

All graduates of Curtin University achieve a set of six Graduate Capabilities during their course of study. These inform an employer that, through your studies, you have acquired discipline knowledge and a range of other skills and capabilities which employers would value in a professional setting. Each unit in your course addresses the Graduate Capabilities through a clearly identified set of learning outcomes. They form a vital part in the process referred to as assurance of learning. The learning outcomes notify you of what you are expected to know, understand or be able to do in order to be successful in this unit. Each assessment for this unit is carefully designed to test your knowledge of one or more of the unit learning outcomes. On successfully completing all of the assessments you will have achieved all of these learning outcomes.

Your course has been designed so that on graduating you will have achieved all of Curtin's Graduate Capabilities through the assurance of learning processes in each unit.

	On successful completion of this unit students can:	Graduate Capabilities addressed
1	Evaluate the different concepts of OS that evolve with the new development of computer technologies and applications	
2	Assess different kinds of process/thread management problems and algorithms	
3	Assess the methods used in memory system design and management, file system design and management	
4	Access and evaluate information to synthesise computing solutions	
5	Evaluate the advantages and limitations of different I/O and disk technologies	
6	Assess the needs of system protection and security, and their implementation	

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Curtin's Graduate Capabilities

☑	Apply discipline knowledge, principles and concepts	💡	Innovative, creative and entrepreneurial	◰	Effective communicators with digital competency
🌐	Globally engaged and responsive	👥	Culturally competent to engage respectfully with local First Peoples and other diverse cultures	ⓘ	Industry connected and career capable

Find out more about Curtin's Graduate Capabilities at the Curtin Learning and Teaching website: clt.curtin.edu.au

Learning Activities

The lectures provide the theoretical foundations for achieving the unit learning outcomes. The workshops and assignment project further develop on the lectures to enhance the student understanding of the unit materials and/or give students hands-on experiences on the underlying theories.

All students in this unit are expected to participate in every weekly learning activity, whether they are face to face or online. For online content simply go to Blackboard to attend the live sessions or access recordings as appropriate. Each week there is an expectation that you will arrive in a face-to-face or online class having completed any previous assigned work.

Workshop: 1 x 1hr
Lecture: 1 x 2hr

Learning Resources
Essential texts

The required textbook(s) for this unit are:

- A. Silberschatz, P.B. Galvin, and G. Gagne, Operating System Concepts, 9th Edition or 10th Edition, John Wiley & Sons (ISBN/ISSN: 9781118063330)

  (ISBN/ISSN: 9781118063330)

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Assessment

Assessment policy exemptions

- There are no exemptions to the assessment policy

Assessment schedule

	Task	Value %	Date Due	Unit Learning Outcome(s) Assessed	Late Assessments Accepted?*	Assessment Extensions Considered?*
1	Assignment	15%	**Week:** 11 **Day:** Monday **Time:** 4pm	2	Yes	No
2	Mid-semester Test	35%	**Week:** 7 **Day:** Monday **Time:** 10am	1,2	No	No
3	Final Examination	50%	**Week:** TBD **Day:** TBD **Time:** TBD	3,4,5,6	No	Yes

*Please refer to the Late Assessment and the Assessment Extension sections below for specific details and conditions.

Detailed information on assessment tasks

1. The assignment specification will be posted in the unit blackboard in week 5. Students are required to demonstrate their assignments.
2. NO MAKEUP (LATE) MIDTEST WILL BE GIVEN. To pass the mid-test, you need to read the lecture notes AND the reading assignments around the subject from the required textbook, AND their corresponding workshops. You need to spend approximately 4 hours reading around the subject covered in each lecture. In addition, you also include some extra hours to spend for revising for the test. Test will be handed back in workshop sessions.
3. Final Assessment materials will mostly cover the materials that have not been assessed in the Midtest.

Pass requirements
must have attempted the mid-semester test, and
must have attempted the assignment, and
must achieve a mark of at least 45% in the final assessment and
must have the overall unit assessment of at least 50%.

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Assessment Moderation

Fair assessment through moderation

Moderation describes a quality assurance process to ensure that assessments are appropriate to the learning outcomes, and that students work is evaluated consistently by assessors. Minimum standards for the moderation of assessments are described in the Assessment and Student Progression Manual, available from policies.curtin.edu.au/findapolicy/

Pre-marking moderation

This unit complies with moderation of assessments as described in the Assessment and Student Progression Manual, available from policies.curtin.edu.au/findapolicy/

Intra-marking / Post-marking moderation

This unit complies with moderation of assessments as described in the Assessment and Student Progression Manual, available from policies.curtin.edu.au/findapolicy/

Late assessment

Where the submission of a late assessment is permitted, late penalties will be consistently applied in this unit.

Where a late assessment **is** permitted for an assessment item or the entirety of the unit (refer to the Assessment Schedule table in this Unit Outline) and the student does not have an approved assessment extension:

1. For assessment items submitted within the first 24 hours after the due date/time, students will be penalised by a deduction of 5% of the total marks allocated for the assessment task;
2. For each additional 24 hour period commenced an additional penalty of 10% of the total marks allocated for the assessment item will be deducted; and
3. Assessment items submitted more than 168 hours late (7 calendar days) will receive a mark of zero.

Where late assessment **is NOT** permitted for an assessment item or the entirety of the unit (refer to the Assessment Schedule table in this Unit Outline) and the student does not have an approved assessment extension:

1. All assessment items submitted after the due date/time will receive a mark of zero.

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Assessment extension

Where an application for an assessment extension **is** permitted for an assessment item(s) within this unit (refer to the Assessment Schedule table in this Unit Outline):

1. A student who is unable to complete an assessment item by/on the due date/time as a result of exceptional circumstances beyond the student's control, may apply for an assessment extension on the Assessment Extension Application Form as prescribed by the Academic Registrar. The form is available on the Forms page at https://students.curtin.edu.au/essentials/forms-documents/forms/ and also within the student's OASIS (My Studies tab – Quick Forms) account.
2. The student will be expected to submit their application for an Assessment Extension with supporting documentation:
    a. Australian Campuses: via the online form
    b. Offshore campuses: to the School representative nominated below
3. Timely submission of this information supports the assessment process. For applications that are declined, delayed submission may have significant ramifications on the possible marks awarded.
4. An application may be accepted up to five working days after the due date/time of the assessment item where the student is able to provide a verifiable explanation as to why they were not able to submit the application prior to the assessment due date/time

Where an application for an assessment extension **is NOT** permitted for an assessment item(s) within this unit (refer to the Assessment Schedule table in this Unit Outline):

1. All assessment items submitted after the due date/time will be subject to late penalties or receive a mark of zero depending on the unit permitting late assessment submissions.

Australian campuses – School contact for Assessment Extension enquiries (submission is via the online form):
EECMS-Students <EECMSstudents@curtin.edu.au>

Deferred assessments

If your results show that you have been granted a deferred assessment you should immediately check OASIS for details.

Deferred examinations/tests will be held from 19/07/2021 to 23/07/2021 . Notification to students will be made after the Board of Examiners' meeting via the Official Communications Channel (OCC) in OASIS.

Further assessment

Further assessments, if granted by the Board of Examiners, will be held between 19/07/2021 and 23/07/2021 . Notification to students will be made after the Board of Examiners meeting via the Official Communications Channel in OASIS.

It is the responsibility of the student to be available to complete the requirements of a further assessment. If your results show that you have been granted a further assessment you should immediately check OASIS for details.

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Reasonable adjustments for students with disabilities/health circumstances likely to impact on studies

A Curtin Access Plan (CAP) is a document that outlines the type and level of support required by a student with a disability or health condition to have equitable access to their studies at Curtin. Carers for people with disability may also be eligible for support. This support can include alternative exam or test arrangements, study materials in accessible formats, access to Curtin's facilities and services or other support as discussed with an advisor from AccessAbility Services.

Documentation is required from your treating Health Professional to confirm your health circumstances or carer responsibilities.

If you think you may be eligible for a CAP, please contact AccessAbility Services. If you already have a CAP please provide it to the Unit Coordinator in week 1 of each study period.

Referencing style

The referencing style for this unit is Chicago 17th B.

More information can be found on this style from the Library web site:
http://libguides.library.curtin.edu.au/referencing.

Privacy

As part of a learning or assessment activity, or class participation, your image or voice may be recorded or transmitted by equipment and systems operated by Curtin University. Transmission may be to other venues on campus or to others both in Australia and overseas.

Your image or voice may also be recorded by students on personal equipment for individual or group study or assessment purposes. Such recordings may not be reproduced or uploaded to a publicly accessible web environment. If you wish to make such recordings for study purposes as a courtesy you should always seek the permission of those who are impacted by the recording.

Recording of classes or course materials may not be exchanged or distributed for commercial purposes, for compensation, or for any other purpose other than personal study for the enrolled students in the unit. Breach of this may subject a student to disciplinary action under Statute No 10 – Student Disciplinary Statute.

If you wish to discuss this please talk to your Unit Coordinator.

Copyright

The course material for this unit is provided to you for your own research and study only. It is subject to copyright. It is a copyright infringement to make this material available on third party websites.

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Academic Integrity (including plagiarism and cheating)
Academic Integrity

Curtin's Student Charter, Academic Integrity Program (AIP), and core Values guide expectations regarding student behaviour and responsibilities. Information on these topics can be found on the Student Essentials Website or the Academic Integrity tab in Blackboard.

Academic Integrity Warnings

An Academic Integrity Warning may be issued to a New-to-Curtin student if they have inadequately acknowledged sources or collaborated inappropriately. The Management of Academic Integrity Warnings for New to Curtin Students Procedures provide further information and explain who is considered to be New-to-Curtin.

Academic Misconduct

Students with an academic breach that do not meet the New-to-Curtin criteria will be managed through the misconduct process. Academic Misconduct means conduct by a student that is dishonest or unfair in connection with any academic work. This includes all types of plagiarism, cheating, collusion, falsification or fabrication of data or other content, and Academic Misconduct Other, such as falsifying medical certificates for extension. More details can be found on the Student Essentials Website or on the Academic Integrity Website.

Staff members are required to report suspected misconduct and an inquiry may take place. If misconduct is determined it will result in penalties, which may include a warning, a reduced or nil grade, a requirement to repeat the assessment, an annulled grade (ANN) or termination from the course. Some penalties may impact on future enrolment.

Academic work under inquiry will not be graded until the process has concluded. If your work is the subject of an inquiry you will be notified by email and Official Communication with an opportunity to respond. Appropriate support will be provided. For more information refer to Statute No.10 Student Discipline and Academic Misconduct Rules.

Information and Communications Technology (ICT) Expectations

Curtin students are expected to have reliable internet access in order to connect to OASIS email and learning systems such as Blackboard and Library Services.

You may also require a computer or mobile device for preparing and submitting your work.

For general ICT assistance, in the first instance please contact OASIS Student Support:
oasisapps.curtin.edu.au/help/general/support.cfm

For specific assistance with any of the items listed below, please contact The Learning Centre:
life.curtin.edu.au/learning-support/learning_centre.htm

- Using Blackboard, the I Drive and Back-Up files
- Introduction to PowerPoint, Word and Excel

Additional information
Enrolment

It is your responsibility to ensure that your enrolment is correct - you can check your enrolment through the eStudent option on OASIS, where you can also print an Enrolment Advice.

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Student Rights and Responsibilities

It is the responsibility of every student to be aware of all relevant legislation, policies and procedures relating to their rights and responsibilities as a student. These include:

- the Student Charter
- Values and Signature Behaviours
- the University's policy and statements on plagiarism and academic integrity
- copyright principles and responsibilities
- the University's policies on appropriate use of software and computer facilities

Information on all of the above is available through the University's "Student Rights and Responsibilities" website at: students.curtin.edu.au/rights.
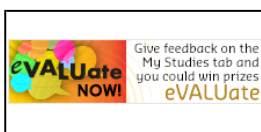
Student Equity

There are a number of factors that might disadvantage some students from participating in their studies or assessments to the best of their ability, under standard conditions. These factors may include a disability or medical condition (e.g. mental illness, chronic illness, physical or sensory disability, learning disability), significant caring responsibilities, pregnancy, religious practices, living in a remote location,or another reason. If you believe you may be unfairly disadvantaged on these or other grounds please contact the appropriate service below. It is important to note that the staff of the University may not be able to meet your needs if they are not informed of your individual circumstances, so please get in touch with the appropriate service if you require assistance.

To discuss your needs in relation to:

- Disability or medical conditions, contact AccessAbility Services: https://students.curtin.edu.au/personal-support/disability/
- Elite athletes, contact Elite Athlete Coordinator: https://stadium.curtin.edu.au/sport/academy/elite-athlete-program/
- All other grounds, contact the Student Wellbeing Advisory Service: https://students.curtin.edu.au/personal-support/counselling-guidance/wellbeing/

Recent unit changes

Students are encouraged to provide unit feedback through **eVALUate**, Curtin's online student feedback system. For more information about **eVALUate**, please refer to evaluate.curtin.edu.au/info/.

eVALUate NOW! Give feedback on the My Studies tab and you could win prizes eVALUate	To view previous student feedback about this unit, search for the Unit Summary Report at https://evaluate.curtin.edu.au/student/unit_search.cfm. See https://evaluate.curtin.edu.au/info/dates.cfm to find out when you can **eVALUate** this unit.

Recent changes to this unit include:

N/A

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Program calendar

Week	Begin Date	Lecture/ Seminar	Pre-readings	Tutorial/Other	Assessment Due
Orientation	22 February	Orientation Week			
1.	1 March	**Lecture 1**: Definition, Purpose, Development, and Design of Operating System - OS structures; System components, OS services, system calls, system programs, system structure, virtual machines, system design and implementation; Overview of Computer System structures.	Chapter 1, 2		
2.	8 March	**Lecture 2**: Process and Thread - Concept, Process scheduling, Process operation and cooperation, Threads, Inter-process communication.	Chapter 3, 4	Workshop 1	
3.	15 March	**Lecture 3**: Process synchronization - Semaphores, Classical problems of synchronization, Critical regions, Monitors.	Chapter 5	Workshop 2	
4.	22 March	**Lecture 4**: CPU scheduling - Basic concepts, CPU scheduling criteria, Scheduling Algorithms, Algorithms evaluation.	Chapter 6	Workshop 3	
5.	29 March	**Lecture 5**: Deadlocks - Model, characterization. Deadlock handling methods: Prevention, Avoidance, Detection and Recovery, Prevention, and Avoidance.	Chapter 7	Workshop 4	
6.	5 April	Tuition Free Week			
7.	12 April	**Mid-Semester Test**			10am, Monday, 12 April, 2020
8.	19 April	Lecture 6: Memory Management - Background, Address space, Swapping, Contiguous allocation, Paging, Segmentation, Segmentation with paging.	Chapter 8	Workshop 5	
9.	26 April	Lecture 7: Virtual memory - Background, Demand Paging and its performance, Page replacement algorithms, Thrashing.	Chapter 9	Workshop 6	

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10.	3 May	Lecture 8: File System Interface and Implementation - File concept, Access Methods, Protection, Implementation.	Chapter 10-11	Workshop 7	
11.	10 May	Lecture 9: I/O Systems - Mass-Storage Structure Overview, I/O hardware, I/O interface; Disk structure, Disk scheduling, Disk Management, Disk Reliability – RAID.	Chapter 12-13	Workshop 8	Assignment due: 4pm, Monday 10 May, 2020.
12.	17 May	Lecture 10: Protection and Security - Goals, Access matrix, Security Problem, Program and System Threats.	Chapter 14-15	Workshop 9	
13.	24 May	Unit Review		Workshop 10	
14.	31 May	Study Week			
15.	7 June	Examinations			
16.	14 June	Examinations			

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