Faculty of Science and Engineering
Department of Computing

Curtin University

Unit Outline

COMP2006 Operating Systems
Semester 1, 2017

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 *AND* 1922 (v.0) Data Structures and Algorithms 120 or any previous version *OR* COMP1002 (v.0) Data Structures and Algorithms 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.

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Location:	Building: 314 - Room: 432
Learning Management System:	Blackboard (lms.curtin.edu.au)

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.

Unit Learning Outcomes

All graduates of Curtin University achieve a set of nine graduate attributes during their course of study. These tell an employer that, through your studies, you have acquired discipline knowledge and a range of other skills and attributes which employers say would be useful in a professional setting. Each unit in your course addresses the graduate attributes 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 tell you 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 achievement 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 we can say you will have achieved all of Curtin's Graduate Attributes through the assurance of learning process in each unit.

	On successful completion of this unit students can:	Graduate Attributes 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 Attributes

☑	Apply discipline knowledge	💡	Thinking skills (use analytical skills to solve problems)	ⓘ	Information skills (confidence to investigate new ideas)
💬	Communication skills	🖥	Technology skills	⟳	Learning how to learn (apply principles learnt to new situations) (confidence to tackle unfamiliar problems)
ⓡ	International perspective (value the perspectives of others)	🌐	Cultural understanding (value the perspectives of others)	👥	Professional Skills (work independently and as a team) (plan own work)
Find out more about Curtin's Graduate attributes at the Office of Teaching & Learning website: ctl.curtin.edu.au					

Learning Activities

The lectures provide the theoretical foundations for achieving the unit learning outcomes. The tutorials and 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.

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 Update (2012), John Wiley & Sons.

  (ISBN/ISSN: 9781118063330)

Assessment
Assessment schedule

	Task	Value %	Date Due	Unit Learning Outcome(s) Assessed
1	Mid-semester Test	35 percent	**Week:** 6 **Day:** Tuesday **Time:** 10am	1,2
2	Assignment	15 percent	**Week:** 11 **Day:** Monday **Time:** 4pm	2
3	Final Examination	50 percent	TBA	3,4,5,6

Detailed information on assessment tasks

1. The mid-semester test will be held during lecture. 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 tutorials. 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 tutorial sessions within 3 weeks of sitting the test.

2. The assignment specification will be posted in the unit blackboard in week 5. Assignment assessment may include program demo and/or quiz.

3. Exam materials will mostly cover the materials that have not been assessed in the Midtest.

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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 exam and
- must have the overall unit assessment of at least 50%.

Fair assessment through moderation

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

Late assessment policy

This ensures that the requirements for submission of assignments and other work to be assessed are fair, transparent, equitable, and that penalties are consistently applied.

1. All assessments students are required to submit will have a due date and time specified on this Unit Outline.
2. Students will be penalised by a deduction of ten percent per calendar day for a late assessment submission (e.g. a mark equivalent to 10% of the total allocated for the assessment will be deducted from the marked value for every day that the assessment is late). This means that an assessment worth 20 marks will have two marks deducted per calendar day late. Hence if it was handed in three calendar days late and given a mark of 16/20, the student would receive 10/20. An assessment **more than seven calendar days overdue will not be marked and will receive a mark of 0.**

Assessment extension

A student unable to complete an assessment task by/on the original published date/time (e.g. examinations, tests) or due date/time (e.g. assignments) must apply for an assessment extension using the Assessment Extension form (available from the Forms page at students.curtin.edu.au/administration/) as prescribed by the Academic Registrar. It is the responsibility of the student to demonstrate and provide evidence for exceptional circumstances beyond the student's control that prevent them from completing/submitting the assessment task.

The student will be expected to lodge the form and supporting documentation with the unit coordinator before the assessment date/time or due date/time. An application may be accepted up to five working days after the date or due date of the assessment task where the student is able to provide an acceptable explanation as to why he or she was not able to submit the application prior to the assessment date. An application for an assessment extension will not be accepted after the date of the Board of Examiners' meeting.

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 18/07/2017 to 21/07/2017 . Notification to students will be made after the Board of Examiners' meeting via the Official Communications Channel (OCC) in OASIS.

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Supplementary assessments

Supplementary assessments, if granted by the Board of Examiners, will have a due date or be held between 18/07/2017 and 21/07/2017 . Notification to students will be made after the Board of Examiners' meeting via the Official Communications Channel (OCC) in OASIS.

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

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. 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 Disability Services (disability.curtin.edu.au). Documentation is required from your treating Health Professional to confirm your health circumstances.

If you think you may be eligible for a CAP, please contact Disability Services. If you already have a CAP please provide it to the Unit Coordinator at the beginning of each semester.

Referencing style

The referencing style for this unit is Chicago.

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

Copyright

© Curtin University. 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.

Academic Integrity (including plagiarism and cheating)

Any conduct by a student that is dishonest or unfair in connection with any academic work is considered to be academic misconduct. Plagiarism and cheating are serious offences that will be investigated and may result in penalties such as reduced or zero grades, annulled units or even termination from the course. Assessments under investigation will not be given a mark until the matter is concluded. This may result in the unit grade being withheld or a grade of Fail Incomplete (F-IN) until a decision has been made by the Student Disciplinary Panel. This may impact on enrolment in further units/study periods.

Plagiarism occurs when work or property of another person is presented as one's own, without appropriate acknowledgement or referencing. Submitting work which has been produced by someone else (e.g. allowing or contracting another person to do the work for which you claim authorship) is also plagiarism. Submitted work is subjected to a plagiarism detection process, which may include the use of text matching systems or interviews with students to determine authorship.

Cheating includes (but is not limited to) asking or paying someone to complete an assessment task for you or any use of unauthorised materials or assistance during an examination or test.

From Semester 1, 2016, all incoming coursework students are required to complete Curtin's Academic Integrity Program (AIP). If a student does not pass the program by the end of their first study period of enrolment at Curtin, their marks will be withheld until they pass. More information about the AIP can be found at:
https://academicintegrity.curtin.edu.au/students/AIP.cfm

Refer to the Academic Integrity tab in Blackboard or academicintegrity.curtin.edu.au for more information, including student guidelines for avoiding plagiarism.

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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.

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 these things 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 family 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 Student Equity at eesj@curtin.edu.au or go to http://eesj.curtin.edu.au/student_equity/index.cfm for more information

You can also contact Counselling and Disability services: http://www.disability.curtin.edu.au or the Multi-faith services: http://life.curtin.edu.au/health-and-wellbeing/about_multifaith_services.htm for further information.

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. For general wellbeing concerns or advice please contact Curtin's Student Wellbeing Advisory Service at:
http://life.curtin.edu.au/health-and-wellbeing/student_wellbeing_service.htm

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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	20 February	Orientation Week			
1.	27 February	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.	6 March	Lecture 2: Process and Thread - Concept, Process scheduling, Process operation and cooperation, Threads, Inter-process communication.	Chapter 3, 4	Tutorial 1	
3.	13 March	Lecture 3: Process synchronization - Semaphores, Classical problems of synchronization, Critical regions, Monitors.	Chapter 5	Tutorial 2	
4.	20 March	Lecture 4: CPU scheduling - Basic concepts, CPU scheduling criteria, Scheduling Algorithms, Algorithms evaluation.	Chapter 6	Tutorial 3	
5.	27 March	Lecture 5: Deadlocks - Model, characterization. Deadlock handling methods: Prevention, Avoidance, Detection and Recovery, Prevention, and Avoidance.	Chapter 7	Tutorial 4	
6.	3 April	Mid-Semester Test	Materials from Lecture 1 to 4, and Tutorial 1 to 4	Mid-Semester Test	
7.	10 April	Tuition Free Week **For Bentley students only - Tuesday, April 11, 2017.** Lecture 6: Memory Management - Background, Address space, Swapping, Contiguous allocation, Paging, Segmentation, Segmentation with paging. **The make up for the Lecture on Tuesday, April 25 (Curtin public holiday)**			
8.	17 April	Tuition Free Week			
9.	24 April	**For Bentley students only** **Tuesday, April 25: Curtin public holiday – No Lecture** The lecture on this week has been rescheduled on Tuesday, April 11.	Chapter 8	Tutorial 5	
10.	1 May	Lecture 7: Virtual memory - Background, Demand Paging and its performance, Page replacement algorithms, Thrashing.	Chapter 9	Tutorial 6	
11.	8 May	Lecture 8: File System Interface and Implementation - File concept, Access Methods, Protection, Implementation.	Chapter 10, 11	Tutorial 7	Assignment due: Monday 4pm.
12.	15 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	Tutorial 8	
13.	22 May	Lecture 10: Protection and Security - Goals, Access matrix, Security Problem, Program and	Chapter 14, 15	Tutorial 9	

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		System Threats.			
14.	29 May	Unit Review		Tutorial 10	
15.	5 June	Study Week			
16.	12 June	Examinations			
17.	19 June	Examinations			

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