

System Software – 7171

Unit Outline 2009

Faculty of Information Sciences and Engineering

University of Canberra

*Australian Government Higher Education (CRICOS)
Registered Provider number: #00212K*

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This Unit Outline must be read in conjunction with:

- a) *Studying at the University of Canberra: A Guide to Policies and Procedures*, which sets out University-wide policies and procedures, including information on matters such as plagiarism, grade descriptors, moderation, feedback and deferred exams, and is available at <http://www.canberra.edu.au/student-services>
- b) *Guide to Student Services at the University of Canberra*, and is available at <http://www.canberra.edu.au/student-services>
- c) Any additional information specified in section 6f.

1: General Information

- 1a Unit title**
System Software
- 1b Unit number**
7171
- 1c Semester and year offered**
S1, 2009
- 1d Credit point value**
3 CP
- 1e Unit level**
2
- 1f Name of Unit Convener and contact details (including telephone and email)**
Dr Wanli Ma, 6201 2838, Wanli.Ma@canberra.edu.au, Office 11B45
- 1g Name of Unit Moderator and contact details (including telephone and email)**
Mr Chris Chlap, 6201-2391, Chris.Chlap@canberra.edu.au, Office 11B16
- 1h Administrative contact details (including name, location, telephone and email)**

2: Academic Content

2a Unit description and learning outcomes

This subject aims to introduce Operating System concepts to students who have a good understanding of application level programming in high-level languages. The subject provides an introduction to the necessary system architecture concepts for the further study of operating systems. It then builds upon these foundations to provide an understanding of modern Operating Systems. The subject also teaches students basic system administration skills for commonly used operating systems.

Upon successful completion of this subject the student will be able to demonstrate an understanding of:

- The fundamental architecture of modern computers at a level sufficient for the understanding of Operating Systems
- The general characteristics and structure of a modern Operating System.
- Processes and Threads – their implementation and use
- Inter-Process Communication techniques
- Memory Management and Virtual Memory
- Scheduling
- I/O Management and File System architecture.
- Basic system administration skills for commonly used operating systems.

This unit also addresses and promotes the UC graduate attributes on generic skills and attributes as listed in “*Generic skills and attributes of University of Canberra graduates from undergraduate and postgraduate coursework courses*”
<http://www.canberra.edu.au/uc/policies/acad/generic.html>. Please see also the Unit Design for the tactics used in addressing generic skills.

2b Prerequisites and/or co-requisites

Software Technology 1 and one of Discrete Mathematics and Mathematics for Information Sciences

3: Delivery of Unit and Timetable

3a Delivery mode

This subject is delivered on campus with daily lectures and tutorials/labs, as per UC timetable.

3b Schedule of topics/lectures/tutorials/practicals/field classes by the day

Week	Activity
	Note: this is a proposed schedule with informative value only
1	Computer architecture and operating system: Introduction
2	Communication with operating systems
3	Process, thread, SMP, and microkernels

4	Process, thread, SMP, and microkernels
5	Concurrency: mutual exclusion, synchronization, deadlock, and starvation
6	Concurrency: mutual exclusion, synchronization, deadlock, and starvation
7	Scheduling: uniprocessor
8	<i>class free period</i>
9	<i>class free period</i>
10	Memory management
11	Virtual memory
12	Virtual memory
13	I/O management and disk scheduling
14	File management
15	Distributed systems, Summary

4: Unit Resources

4a Lists of required texts/readings

Text books:

- “*OPERATING SYSTEMS – Internals and Design Principles*”, William Stallings, 5th Edition (or 6th Edition), Pearson/Prentice Hall 2005

Supplementary readings (not essential):

- “*Microsoft Windows internals : Microsoft Windows server 2003, Windows XP, and Windows 2000*”, Mark E. Russinovich, David A. Solomon, 4th Edition, Microsoft Press
- “*Operating systems : design and implementation*”, Andrew S. Tanenbaum, Albert S. Woodhull, 3rd Edition, Pearson Prentice Hall

Online materials:

Lecture materials, tutorial questions and answers, assignment specifications, and other related information are available from <http://learnonline.canberra.edu.au>.

4b Materials and equipment

Computers and software in Building 11 laboratory are used in this unit. The use of private personal computers and relevant software is beneficial, but not essential.

4c Unit website

<http://learnonline.canberra.edu.au>

5: Assessment

5a Assessment overview

Assessment Item (including exams held in the	Due Date of	Weighting
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exam period)	Assignments	(total to equal 100%)
Assignment 1	23:55, Friday, Week 6	15
Assignment 2	23:55, Friday, Week 14	15
Lab Attendance and Online Quiz during the lab	See 6c for details	10
Final Exam: 3 hours, closed book; permitted materials: 4 sides of A4 sized handwritten notes	University exam time	60

5b Details of each assessment item

Assignment 1: concerning processes, threads, and mutual exclusion.

Assignment 2: concerning memory management and I/O subsystem.

Further details are provided in handout for each assignment.

Final Examination: closed book, no materials are permitted.

Late submission will attract penalties:

- 1 day after the submission deadline, 2 marks penalty, which equals to 2% weight of the total marks.
- 2 days after the submission deadline, 4 marks penalty, which equals to 4% weight of the total marks.
- After 2 days, for each extra day, 3 marks penalty, which equals to 3% weight of the total marks, until up to the full mark of the assignment.

5c Special assessment requirements

For final assessment in the subject, the result will be one of the following grades: HD, DI, CR, P, or Fail. The total mark is calculated by the following formula:

$$\begin{aligned} \text{Total mark} = & \text{Assignment 1 mark} + \\ & \text{Assignment 2 mark} + \\ & \text{Attendance and Online Quiz mark} + \\ & \text{Examination mark} \end{aligned}$$

The grade for the subject is then determined according to the following algorithm, the highest possible:

Total mark \geq 85 and examination mark \geq 85%	HD
Total mark \geq 75 and examination mark \geq 75%	DI
Total mark \geq 65 and examination mark \geq 65%	CR
Total mark \geq 50 and examination mark \geq 50%	P
The rest	FAIL (NX, NS, NC or NN)

5d Supplementary assessment

Not available

5e Text-matching software

Not in use; however, the lecturer reserves the right to ask a student to attend extra oral defence to his/her assignment. Should it happen, the mark for the assignment will be based on the oral performance.

6: Student Responsibility

6a Workload

The amount of time you will need to spend on study in this Unit will depend on a number of factors including your prior knowledge, learning skill level and learning style. Nevertheless, in planning your time commitments you should note that for a 3cp unit the total notional workload is assumed to be 150 hours or an average of 10 hours per day in this case. These hours include time spent in classes and tutorials, and labs.

6b Special needs

Students who need assistance in undertaking the unit because of disability or other circumstances should inform their Unit Convener or the Disabilities Office as soon as possible so the necessary arrangements can be made.

6c Attendance requirements

There will be no roll calls for lectures; however, students are encouraged to make every attempt to attend all scheduled teaching activities. Failing to do so may result poor understanding and failure of the unit.

Students are required to sign attendance record sheets for labs. There are 12 lab sessions. 1 mark, which equals to 1% weight of the total marks, is rewarded for attending 1 lab session, up to 10 marks maximum. For whatever reason, if you miss your own lab session, you should try to catch up in another session. Please let your tutor know the catch-up session, so the lab attendance mark can be rewarded.

Special permissions may be given to some students for missing some lab sessions without penalty. Please talk to your lecturer to make the arrangement.

6d Required IT skills

See Section 2b

6e Costs

Textbook, Web access, and consumables.

Other information, including fees and charges, can be found on OSIS.

6f Additional information

All assignments will require background reading, intelligent criticism, keen observation and the development of a line of argument to support any particular adopted stance. It is also a requirement that each assignment is totally the work of the individual submitting it (unless explicitly stated otherwise) and that it is produced specifically for the subject in question. **The reproduction, paraphrasing, summarizing or otherwise presenting in altered form, another person's ideas or arguments without acknowledgment is plagiarism.** Any form of plagiarism will be reported to the Dean of Faculty for investigation.

7: Student Feedback

All students enrolled in this Unit will have an opportunity to provide anonymous feedback on the Unit at the end of the Semester via the Unit Satisfaction Survey which will be presented to you on OSIS. Your lecturer or tutor may also invite you to provide more detailed feedback on their teaching through an anonymous in-class questionnaire administered through the University's Teaching and Learning Centre (TLC).

8: Authority of this Unit Outline

Any change to the information contained in Section 2 (Academic content), Section 3 (Delivery of Unit and timetable) and Section 5 (Assessment) of this document, will only be made by the Unit Convener if the written agreement of staff and a majority of students has been obtained; and if written advice of the change is then forwarded to each student enrolled in the Unit at their registered term address. Any individual student who believes him/herself to be disadvantaged by a change is encouraged to discuss the matter with the Unit Convener.