MONASH University
Information Technology

# FIT2065
# Operating systems and the Unix environment

## Unit Guide

## Semester 1, 2012



*Last updated: 13 Feb 2012*

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# FIT2065 Operating systems and the Unix environment - Semester 1, 2012

The main topics covered in this unit include computer systems, operating systems, process management and coordination, memory management including modern implementations of virtual memory, file systems, operating system security, shell variant scripting, regular expressions, Unix utilities, Unix file system, Unix system administration and installation, Unix programming, research and development.

## Mode of Delivery

Caulfield (Day)

## Contact Hours

2 hrs lectures/wk, 2 hrs laboratories/wk

## Workload

There are 4 contact hours for this unit per week:

- 2 hours/lecture
- 2 hours/tutorial

The amount of time students need to allocate to their assignment work and understanding of material will vary from student to student. The university model of a 6 point unit suggests that an average workload would be 12 hours per week including the 4 contact hours of classes, and an additional 8 hours of assigned work and private study.

## Unit Relationships

### Prohibitions

CPE3007, CPE2008, CSE2208, CSE2391, CSE3001, CSE3208, CSE3391, FIT3041, GCO3813

### Prerequisites

One of FIT1001, FIT1031 or CSE1201 or equivalent

## Chief Examiner

**Professor Bala Srinivasan**

## Campus Lecturer

## Caulfield

### Professor Bala Srinivasan

# Tutors

## Caulfield

### Professor Bala Srinivasan

# Academic Overview

## Outcomes

At the completion of this unit students will have -
A knowledge and understanding of:

- the role of operating systems in the architecture of computer systems;
- the practical considerations involved in the use of the Unix operating system; specifically memory management, process management and file system implementations;
- the role, utility and syntax of Unix scripting languages;
- considerations and techniques for securing the Unix operating system;
- the responsibilities of and tasks undertaken by Unix system administrators;
- points of contrast and similarity between Unix and other operating systems in widespread use.

Developed attitudes that enable them to:

- appreciate Unix operating system as it is implemented in modern computer systems - Unix system file system, memory management, and networking, and practical functions;
- know how to solve many systems problems using Unix scripting and system facilities;
- appreciate Unix system programming, research and development, and security.

Developed the skills to:

- use important Unix utilities to monitor Unix systems and Unix networks; construct Unix shell scripts to solve many system problems;
- implement security controls in the Unix environment;
- use Unix utilities for data processing, system development and research;
- install and configure the Unix environment;
- use Unix OS for important network servers and tailor their Unix systems to provide important system and network services.

Demonstrated the communication skills necessary to:

- understand the need to balance requirements of users in multiuser operating system environments;
- confidently discuss issues in groups with regard to the implementation of Unix;
- articulate opinions in group environments with respect to the implementation of operating system environments.

## Graduate Attributes

Monash prepares its graduates to be:

1. responsible and effective global citizens who:

a. engage in an internationalised world
b. exhibit cross-cultural competence
c. demonstrate ethical values

critical and creative scholars who:

a. produce innovative solutions to problems
b. apply research skills to a range of challenges
c. communicate perceptively and effectively

## Assessment Summary

Examination (2 hours): 60%; In-semester assessment: 40%

| Assessment Task | Value | Due Date |
|---|---|---|
| Assignment I - Shell Scripting | 20% | Paper copy submission in week 7 in the lecture, soft copy through file transfer - refer to the assignment sheet. |
| Unit Test | 10% | Week 9 tutorial class |
| Assignment II - Programming Exercise | 10% | Paper copy submission in week 11 in the lecture, soft copy through file transfer - refer to the assignment sheet |
| Examination 1 | 60% | To be advised |

## Teaching Approach

**Lecture and tutorials or problem classes**

This teaching and learning approach provides facilitated learning, practical exploration and peer learning.

## Feedback

### Our feedback to You

Types of feedback you can expect to receive in this unit are:

- Informal feedback on progress in labs/tutes
- Graded assignments with comments
- Interviews
- Test results and feedback
- Solutions to tutes, labs and assignments

### Your feedback to Us

Monash is committed to excellence in education and regularly seeks feedback from students, employers and staff. One of the key formal ways students have to provide feedback is through SETU, Student Evaluation of Teacher and Unit. The University's student evaluation policy requires that every unit is evaluated each year. Students are strongly encouraged to complete the surveys. The feedback is anonymous and provides the Faculty with evidence of aspects that students are satisfied and areas for improvement.

For more information on Monash's educational strategy, and on student evaluations, see:
http://www.monash.edu.au/about/monash-directions/directions.html
http://www.policy.monash.edu/policy-bank/academic/education/quality/student-evaluation-policy.html

## Previous Student Evaluations of this unit

Based on feedback:

- The practical component will be complemented with theoretical questions in the tutorials;
- Supporting theory will be added as part of the lectures; and
- The non-assessable weekly quizzes will continue.

If you wish to view how previous students rated this unit, please go to
https://emuapps.monash.edu.au/unitevaluations/index.jsp

## Recommended Resources

Access to Linux or Unix off-campus would be useful, but is not required.

# Unit Schedule

| Week | Activities | Assessment |
|---|---|---|
| 0 | | No formal assessment or activities are undertaken in week 0 |
| 1 | Computer systems overview, introduction to Unix and brief history of Unix | |
| 2 | Getting a handle on the Unix OS | |
| 3 | Shell scripting | |
| 4 | Process description and control I | |
| 5 | Process description and control II | |
| 6 | Concurrency, deadlock and starvation | |
| 7 | Memory management | Assignment I due |
| 8 | File management | |
| 9 | Unix utilities | Unit test |
| 10 | Unix security | |
| 11 | System administration | Assignment II due |
| 12 | Review | |
| | SWOT VAC | No formal assessment is undertaken SWOT VAC |
| | Examination period | LINK to Assessment Policy: http://policy.monash.edu.au/policy-bank/academic/education/assessment/assessment-in-coursework-policy.html |

*Unit Schedule details will be maintained and communicated to you via your MUSO (Blackboard or Moodle) learning system.

# Assessment Requirements

## Assessment Policy

Faculty Policy - Unit Assessment Hurdles
(http://www.infotech.monash.edu.au/resources/staff/edgov/policies/assessment-examinations/unit-assessment-hu

## Assessment Tasks

## Participation

- **Assessment task 1**

**Title:**
Assignment I - Shell Scripting
**Description:**
An individual assessment where students have to develop a working shell script for a practical problem. This is purely a programming exercise. The specification of the assignment will be provided in week 3.
**Weighting:**
20%
**Criteria for assessment:**
The program will be assessed on the following:

- Functionality;
- Efficiency;
- Correctness;
- Generality of the software;
- Error conditions, error trapping and error messages; and
- Readability and modularity of the code.

**Due date:**
Paper copy submission in week 7 in the lecture, soft copy through file transfer - refer to the assignment sheet.

- **Assessment task 2**

**Title:**
Unit Test
**Description:**
The unit test will be conducted in the week 9 tutorial class as a combination multiple choice written test and a scripting exercise. Since it is conducted during the tutorial sessions, each tutorial class will have a different set of multiple choice and scripting questions. The unit test will have the same format as that of the final examination paper.
**Weighting:**
10%
**Criteria for assessment:**

- Correct answers to multiple choice questions (no negative marks for incorrect answers).
- The scripting part will be assessed based on the correctness of the script.

**Due date:**
Week 9 tutorial class

- **Assessment task 3**

**Title:**
Assignment II - Programming Exercise
**Description:**
An individual assessment where students have to develop a working program for a practical problem using the concepts learned in this unit. This is purely a programming exercise and you are free to choose any programming language for implementation. However, C language will be used for the examples in the labs. The specification of the assignment will be provided in week 7.
**Weighting:**
10%
**Criteria for assessment:**
The program will be assessed on the following:

- Functionality;
- Efficiency;
- Correctness;
- Error conditions, error trapping and error messages; and
- Readability and modularity of the code.

**Due date:**
Paper copy submission in week 11 in the lecture, soft copy through file transfer - refer to the assignment sheet

# Examinations

- **Examination 1**

**Weighting:**
60%
**Length:**
2 hours
**Type (open/closed book):**
Closed book
**Electronic devices allowed in the exam:**
None

# Assignment submission

It is a University requirement (http://www.policy.monash.edu/policy-bank/academic/education/conduct/plagiarism-procedures.html) for students to submit an assignment coversheet for each assessment item. Faculty Assignment coversheets can be found at http://www.infotech.monash.edu.au/resources/student/forms/. Please check with your Lecturer on the submission method for your assignment coversheet (e.g. attach a file to the online assignment submission, hand-in a hard copy, or use an online quiz).

# Online submission

If Electronic Submission has been approved for your unit, please submit your work via the VLE site for this unit, which you can access via links in the my.monash portal.

## Extensions and penalties

Submission must be made by the due date otherwise penalties will be enforced.

You must negotiate any extensions formally with your campus unit leader via the in-semester special consideration process:
http://www.infotech.monash.edu.au/resources/student/equity/special-consideration.html.

## Returning assignments

Students can expect assignments to be returned within two weeks of the submission date or after receipt, whichever is later.

# Other Information

## Policies

Monash has educational policies, procedures and guidelines, which are designed to ensure that staff and students are aware of the University's academic standards, and to provide advice on how they might uphold them. You can find Monash's Education Policies at: http://policy.monash.edu.au/policy-bank/academic/education/index.html

Key educational policies include:

- Plagiarism (http://www.policy.monash.edu/policy-bank/academic/education/conduct/plagiarism-policy.html)
- Assessment (http://www.policy.monash.edu/policy-bank/academic/education/assessment/assessment-in-coursework-po
- Special Consideration (http://www.policy.monash.edu/policy-bank/academic/education/assessment/special-consideration-policy.h
- Grading Scale (http://www.policy.monash.edu/policy-bank/academic/education/assessment/grading-scale-policy.html)
- Discipline: Student Policy (http://www.policy.monash.edu/policy-bank/academic/education/conduct/student-discipline-policy.html)
- Academic Calendar and Semesters (http://www.monash.edu.au/students/key-dates/);
- Orientation and Transition (http://www.infotech.monash.edu.au/resources/student/orientation/); and
- Academic and Administrative Complaints and Grievances Policy (http://www.policy.monash.edu/policy-bank/academic/education/management/complaints-grievance-policy.
- Codes of Practice for Teaching and Learning (http://www.policy.monash.edu.au/policy-bank/academic/education/conduct/suppdocs/code-of-practice-tea

## Student services

The University provides many different kinds of support services for you. Contact your tutor if you need advice and see the range of services available at www.monash.edu.au/students. For Sunway see http://www.monash.edu.my/Student-services, and for South Africa see http://www.monash.ac.za/current/

The Monash University Library provides a range of services and resources that enable you to save time and be more effective in your learning and research. Go to http://www.lib.monash.edu.au or the library tab in my.monash portal for more information. At Sunway, visit the Library and Learning Commons at http://www.lib.monash.edu.my/. At South Africa visit http://www.lib.monash.ac.za/.

Academic support services may be available for students who have a disability or medical condition. Registration with the Disability Liaison Unit is required. Further information is available as follows:

- Website: http://monash.edu/equity-diversity/disability/index.html;
- Email: dlu@monash.edu
- Drop In: Equity and Diversity Centre, Level 1 Gallery Building (Building 55), Monash University, Clayton Campus, or Student Community Services Department, Level 2, Building 2, Monash University, Sunway Campus
- Telephone: 03 9905 5704, or contact the Student Advisor, Student Commuity Services at 03 55146018 at Sunway

## Reading list

Partial reading list for this unit (Note: Multiple copies of the listed books are available in Monash Libraries):

- William Stallings, "Operating Systems: Internals and Design Principles", 7th Ed.
- Silberschatz, Galvin and Gagne, "Operating Systems Concepts", John Wiley & Sons, Inc. 7th Ed.
- Marshall Kirk McKusick and George V. Neville-Neil, "The Design and Implementation of the FreeBSD Operating System", Addison-Wesley Professional", Latest Ed.
- Andrew S. Tanenbaum, "Modern Operating Systems", Prentice-Hall, Latest Ed.
- Craig Hunt, "TCP/IP Network Administration", O'Reilly & Associates, Inc. Latest Ed.
- Simson Garfinkel and Gene Spafford, "Practical Unix & Internet Security", O'Reilly & Associates, Inc. Latest Ed.