



MONASH University

FIT3037
Software engineering

Unit Guide

Semester 2, 2009

The information contained in this unit guide is correct at time of publication. The University has the right to change any of the elements contained in this document at any time.

Last updated : 13 Jul 2009

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Chief Examiner:

Dr Raymond Smith

Lecturer

Phone: +61 3 990 26462

Lecturer(s) / Leader(s):

Gippsland

Dr Raymond Smith

Lecturer

Phone: +61 3 990 26462

Contact hours: Email for an appointment

Additional communication information:

All communication of a personal nature should be directed by email to the responsible lecturer at your campus. All general queries should be posted to the appropriate discussion forum so all students can participate in the discussion and be aware of the outcome of these discussions.

Introduction

Welcome to Software Engineering!

Software engineering is a very wide ranging unit which attempts to consolidate many things you will probably have come across before (eg process models, analysis and design methods etc) and give each a better context within the overall domain. We also introduce a few distinctly different aspects that few will have seen before, these include formal methods, real-time analysis and configuration management. Overall the objective is to develop a greater understanding of the complexity and magnitude of creating very large software systems and the methods and techniques used to overcome the problems that may be encountered.

Don't hesitate to ask questions via the discussion forums, answer other students queries if you can and participate as much as possible.

Regards,

Ray

Unit synopsis

In this unit students will learn about many aspects of working with a large team on large projects to produce quality software products on time and within budget. The student will gain an appreciation of the tools and techniques used to develop software systems within a group context. Topics to be studied include: software development lifecycle models; sizing, estimation, planning and control of projects; functional specification and design of real-time systems; formal specification and design using Z; integration and testing strategies, configuration management; reuse and re-engineering.

Learning outcomes

At the completion of this unit, students will have knowledge of:

1. the continuing software crisis, problems encountered in the development of large software systems: poor quality, late delivery and budget overruns;
2. techniques used in software engineering to counter these problems.

At the completion of this unit, students will have understanding of:

1. the role of software lifecycle models in project control and planning;
2. different categories of software metrics;
3. software estimation methods;
4. methods for specifying real-time systems;
5. techniques and tools to support configuration management;
6. strategies for testing software;
7. the roles and responsibilities of project team members.

At the completion of this unit, students will have skills in:

1. applying techniques for scheduling and control of large projects;
2. constructing and validating a software specification;
3. formal methods specification of software systems;
4. functional design of software systems;
5. describing large software systems using appropriate language and technical specification techniques to suit the intended audience.

At the completion of this unit, students will have awareness that quality software is not a luxury but essential in solving the software crisis.

Contact hours

one x 2hr lecture/week, one x 2hr tutorial/week

Workload

For on campus students, workload commitments are:

- two-hour lecture and
- two-hour tutorial (or laboratory) (requiring advance preparation)
- a minimum of 2 hours of personal study per one hour of contact time in order to satisfy the reading and assignment expectations.

- You will need to allocate up to 4 hours per week in some weeks, for use of a computer, including time for newsgroups/discussion groups.

Off-campus students generally do not attend lecture and tutorial sessions, however, you should plan to spend equivalent time working through the relevant resources and participating in discussion groups each week.

Unit relationships

Prerequisites

[FIT2005](#)

Prohibitions

CSE2201, CSE2401, (Transition set:GCO3811), [FIT2024](#)

Relationships

FIT3037 is a core unit in the Applications Development and Networks major in the BITS. It is an approved third level elective for the Business Systems major.

Before attempting this unit you must have satisfactorily completed FIT2005 or equivalent. You should have:

- the ability to analyse an information system specification and develop detailed and appropriate models;
- familiarity with the commonly used software analysis and design methodologies, including structured analysis and design and the object oriented techniques;

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- basic programming skills and general familiarity with the processes involved in the development of software using languages like Java and C/C++

You may not study this unit and CSE2201 or CSE2401 or GCO3811 or FIT2024 in your degree.

Teaching and learning method

This unit requires a fair amount of reading, both from the textbook Pressman and also the study guide/lecture slides. The unit covers much territory you will be familiar with in isolation but attempts to bring it together as a coherent knowledge base to describe the methods used in the development of large software engineering projects. The tutorial questions available from the MUSO site are there for you to judge how well you understand the concepts. If you find you are struggling with these please do some further reading and if still in doubt ask via the discussion forums.

Timetable information

For information on timetabling for on-campus classes please refer to MUTTS, <http://mutts.monash.edu.au/MUTTS/>

Tutorial allocation

On-campus students should register for tutorials/laboratories using the Allocate+ system:

<http://allocate.cc.monash.edu.au/>

Unit Schedule

Week	Topic	Study guide	References/Readings	Key dates
1	Introduction, Process models, metrics, requirements specifications	1	Pressman Ch 1, 3, 14.4, 15, 22	
2	Interface analysis and design	2	Pressman Ch 12	
3	Real-time Specification	3	Pressman Ch 7.1-7.4, 8.2-8.7	
4	Formal methods introduction	3	Pressman Ch 28	Ass 1 due 12/8/09
5	Formal specification - Z	3	Pressman Ch 28	
6	System and Software Design	4	Pressman Ch 9, 10.1-10.5, 11.1-11.2	
7	Project and risk management	5	Pressman Ch 21, 25	
8	Software Estimation	5	Pressman Ch 23	Ass 2 due 10/9/09
9	Component-based development, Cleanroom Software Engineering	6	Pressman Ch 29,30	
10	Software Testing and Strategies	7	Pressman Ch 13, 14	
Mid semester break				
11	Software configuration maintenance	8	Pressman 27	Ass 3 due 8/10/09
12	Software re-engineering	8	Pressman Ch 31	

Unit Resources

Prescribed text(s) and readings

Pressman R.S., Software Engineering: A Practitioners Approach, Sixth Edition, McGraw-Hill, 2005. ISBN 007-123840-9

Text books are available from the [Monash University Book Shops](#). Availability from other suppliers cannot be assured. The Bookshop orders texts in specifically for this unit. You are advised to purchase your text book early.

Recommended text(s) and readings

Sommerville, Ian. Software Engineering, Eighth Edition, Addison-Wesley, 2007. ISBN 0-321-31379-8

Van Vliet Hans, Software Engineering: Principles and Practice, Second Edition, John Wiley and Sons, 2000. ISBN 0-497-97508-7

Pfleeger Shari Lawrence, Software Engineering Theory and Practice, Prentice-Hall, 1998. ISBN 0-13-081272-2

Required software and/or hardware

You will need access to a word processor for assignment preparation. A special Z font is available from the MUSO site for development of the Z formal methods specification in assignment 2.

Equipment and consumables required or provided

Students studying off-campus are required to have the minimum system configuration specified by the Faculty as a condition of accepting admission, and regular Internet access. On-campus students, and those studying at supported study locations may use the facilities available in the computing labs. Information about computer use for students is available from the ITS Student Resource Guide in the Monash University Handbook. You will need to allocate up to 4 hours per week for use of a computer, including time for newsgroups/discussion groups.

Study resources

Study resources we will provide for your study are:

- Weekly detailed study guides/lecture slides outlining the learning objectives, discussion of the content, required readings and exercises;
- Weekly tutorial or laboratory tasks and exercises with sample solutions provided one to two weeks later;
- Assignment specifications and sample solutions;
- A sample examination and suggested solution
- Access to past examination papers;
- Discussion groups;
- This Unit Guide outlining the administrative information for the unit;
- The unit web site on MUSO, where resources outlined above will be made available.

Assessment

Overview

Exam (3 hours): 55%; Assignments: 45%

Faculty assessment policy

To pass a unit which includes an examination as part of the assessment a student must obtain:

- 40% or more in the unit's examination, and
- 40% or more in the unit's total non-examination assessment, and
- an overall unit mark of 50% or more.

If a student does not achieve 40% or more in the unit examination or the unit non-examination total assessment, and the total mark for the unit is greater than 44% then a mark of no greater than 44-N will be recorded for the unit.

The unit is assessed with three assignments and a three hour closed book examination. To pass the unit, a student must obtain:

- attempt all assignments and the examination and
- 40% or more in the unit's examination and
- 40% or more in the unit's non-examination assessment and
- an overall unit mark of 50% or more

If a student does not achieve 40% or more in the unit examination or the unit non-examination assessment then a mark of no greater than 44-N will be recorded for the unit.

Assignment tasks

Assignment coversheets

Assignment coversheets are available via "Student Forms" on the Faculty website:

<http://www.infotech.monash.edu.au/resources/student/forms/>

You MUST submit a completed coversheet with all assignments, ensuring that the plagiarism declaration section is signed.

Assignment submission and return procedures, and assessment criteria will be specified with each assignment.

• Assignment task 1

Title:

Requirements specification

Description:

For the proposed system described in the assignment specification the student will analyse the system requirements and then document these requirements to conform with the IEEE Recommended Practice for Software Requirements Specifications as set out in IEEE Std 830.

Weighting:

15%

Due date:

12 August 2009

- **Assignment task 2**

Title:

Formal Specification - Z

Description:

The student will develop a formal specification in Z for an interesting but relatively simple proposed system. This will include the specification of a suitable state space and schemas to perform operations on that state space.

Weighting:

15%

Due date:

10 September 2009

- **Assignment task 3**

Title:

Real-time specification

Description:

The student will analyse a proposed realtime system and present a specification that describes the system operation and constraints of the system.

Weighting:

15%

Due date:

8 October 2009

Examination

- **Weighting:** 55%

Length: 3 hours

Type (open/closed book): Closed book

See Appendix for End of semester special consideration / deferred exams process.

Due dates and extensions

Please make every effort to submit work by the due dates. It is your responsibility to structure your study program around assignment deadlines, family, work and other commitments. Factors such as normal work pressures, vacations, etc. are not regarded as appropriate reasons for granting extensions. Students are advised to NOT assume that granting of an extension is a matter of course.

Students requesting an extension for any assessment during semester (eg. Assignments, tests or presentations) are required to submit a Special Consideration application form (in-semester exam/assessment task), along with original copies of supporting documentation, directly to their lecturer within two working days before the assessment submission deadline. Lecturers will provide specific outcomes directly to students via email within 2 working days. The lecturer reserves the right to refuse late applications.

A copy of the email or other written communication of an extension must be attached to the assignment submission.

Refer to the Faculty Special consideration webpage or further details and to access application forms:

<http://www.infotech.monash.edu.au/resources/student/equity/special-consideration.html>

Late assignment

Assignments received after the due date will be subject to a penalty of **5% per day or part thereof**, including weekends. Assignments received later than one week (cutoff date) after the due date will not normally be accepted.

Return dates

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

Appendix

Please visit the following URL: <http://www.infotech.monash.edu.au/units/appendix.html> for further information about:

- Continuous improvement
- Unit evaluations
- Communication, participation and feedback
- Library access
- Monash University Studies Online (MUSO)
- Plagiarism, cheating and collusion
- Register of counselling about plagiarism
- Non-discriminatory language
- Students with disability
- End of semester special consideration / deferred exams