MONASH University
Information Technology

FIT3037
Software engineering

Unit Guide

Semester 2, 2011

Last updated: 22 Aug 2011

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FIT3037 Software engineering - Semester 2, 2011

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.

Mode of Delivery

- Gippsland (Day)
- Gippsland (Off-campus)
- South Africa (Day)

Contact Hours

2 hrs lectures/wk, 2 hrs tutorials/wk

Workload

Students will be expected to spend a total of 12 hours per week during semester on this unit as follows:

For on campus students, workload commitments are:

- two-hour lecture and
- two-hour tutorial (or laboratory) (requiring advance preparation)
- and up to an additional 8 hours in some weeks for completing lab and project work, private study and revision.

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

Prohibitions

CSE2201, CSE2401, FIT2024, GCO3811

Prerequisites

FIT2005

Chief Examiner

Dr Gour Karmakar

Campus Lecturer

Gippsland

Gour Karmakar

Contact hours: Email for an appointment

South Africa

Stella Ouma

Tutors

Gippsland

Gour Karmakar

South Africa

Stella Ouma

Academic Overview

Learning Objectives

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

- the continuing software crisis, problems encountered in the development of large software systems: poor quality, late delivery and budget overruns;
- techniques used in software engineering to counter these problems;
- the role of software lifecycle models in project control and planning;
- different categories of software metrics;
- software estimation methods;
- methods for specifying real-time systems;
- techniques and tools to support configuration management;
- strategies for testing software;
- the roles and responsibilites of project team members.

Developed the skills to:

- apply techniques for scheduling and control of large projects;
- construct and validate a software specification;
- formal methods specification of software systems;
- functionally design of software systems;
- describe large software systems using appropriate language and technical sprecification techniques to suit the intended audience;
- be aware that quality software is not a luxury but essential in solving the software crisis.

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 (3 hours): 55%; In-semester assessment: 45%

Assessment Task	Value	Due Date
Requirements specification	15%	12 August 2011

Formal Specification - Z	15%	9 September 2011
Real-time specification	15%	11 October 2011
Examination 1	55%	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:

- Graded assignments with comments
- 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

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

Required Resources

Prescribed text(s) and readings

Pressman R.S., Software Engineering: A Practitioners Approach, Sixth Edition, McGraw-Hill, 2005. ISBN 007-123840-9 or Seventh Edition 2010 ISBN 978-007-126782-3

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.

Required software and/or hardware

You will need access to a computer with Word etc. for assignment preparation. A special Z font is available from the MUSO site for development of the Z formal methods specification in Assignment 2.

Computers with MS Office are available in Computer Labs.

Unit Schedule

Week	Activities	Assessment
0		No formal assessment and activities are undertaken in Week 0
1	Introduction, Process models, metrics, requirements specifications	
2	Interface analysis and design	
3	Real-time Specification	
4	Formal methods introduction	Assessment task 1: Requirements Specification due 12 August 2011
5	Formal specification - Z	
6	System and Software Design	
7	Project and risk management	
8	Software Estimation	Assessment task 2: Formal Specification due 9 September 2011
9	Component-based development, Cleanroom Software Engineering	
10	Software Testing and Strategies	
11	Software configuration maintenance	Assessment task 3: Real-time Specification due 11 October 2011
12	Software re-engineering	
	SWOT VAC	No formal assessment is undertaken in 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

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 50% then a mark of no greater than 49-N will be recorded for the unit

Assessment Tasks

Participation

- **Assessment 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%
  Criteria for assessment:
  The full specification and criteria for the assignment will be available early in the semester from the MUSO Moodle site; a summary of the marking criteria is included here.

  The assignment will be marked for conformance to the IEEE standard for Requirements Specification for the logical and complete presentation of the system requirements. The major criteria and the relevant percentages are:

  1. Presentation of document (15%) including table of contents, index, page numbers and formatting, section numbering etc
  2. English grammar and spelling (10%)
  3. Section 1 Introduction (15%) needs to give good introduction to application and its environment and define scope and terminology well
  4. Section 2 Overall description (15%) must provide good background to the environment in which application is to operate, including interfaces with hardware and other systems, user profiles, constraints etc
  5. Section 3 Specific Requirements (45%) needs to include all requirements with sufficient detail to allow design to start. Must clearly and logically include functional and non-functional requirements for the proposed system.

  Due date:
  12 August 2011

- **Assessment 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%

Criteria for assessment:

The full specification and criteria for the assignment will be available early in the semester from the MUSO Moodle site, a summary of the marking criteria is included here.
The major criteria and the relevant percentages are:

1. Presentation and basic layout (5%). Looking for: good layout, adherence to basic Z concepts and structures
2. State Space Specification (15%). Looking for: well defined structure for all the data to be stored. Predicates to hold these structures consistent. Types to be used consistently.
3. Initialisation Schema (10%). Must ensure initialisation cannot be re-run once data input and ensure that all data initialised.
4. Schema Calculus (10%). Looking for: Use of schema calculus to handle error conditions and make schemas less complex. Schema calculus to handle the majority of possible error conditions.
5. Defined Schemas (60%). Schemas defined in the assignment specification to be correctly written in Z with logical and consistent manipulation of the state space and local variables

Due date:

9 September 2011

- **Assessment task 3**

Title:

Real-time specification

Description:

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

Weighting:

15%

Criteria for assessment:

The full specification and criteria for the assignment will be available early in the semester from the MUSO Moodle site, a summary of the marking criteria is included here.
The major criteria and the relevant percentages are:

1. Presentation (5%) - looking for well-presented and laid out specification
2. ERD (10%). Looking for an entity relationship diagram that shows the basic relationships between the system to be developed and the other entities in the environment
3. DFD's and CFD's (30%). Looking for a set of data and control flow diagrams that show the data and control flows around the system. The flows must be maintained between different levels with no overall gain or loss of information.
4. PSPECS (15%). Each process at the lowest level MUST have a specification showing exactly what it does and how the data flowing through the process is

manipulated.

5. CSPECS (20%). Basic job of Control Specification is to show how events in CFD are handled and to synchronise process activation as required. Looking for logical and consistent specification to manage this task.
6. Data Dictionary (10%). Need to include all names in dictionary, including process, data and control flow names
7. Coverage (10%). What percentage of the overall problem has been considered in this solution.

Due date:

11 October 2011

Examinations

- **Examination 1**

Weighting:

55%

Length:

3 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).

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 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. Students who have a disability or medical condition are welcome to contact the Disability Liaison Unit to discuss academic support services. Disability Liaison Officers (DLOs) visit all Victorian campuses on a regular basis

- Website: http://adm.monash.edu/sss/equity-diversity/disability-liaison/index.html;
- Telephone: 03 9905 5704 to book an appointment with a DLO;
- Email: dlu@monash.edu
- Drop In: Equity and Diversity Centre, Level 1 Gallery Building (Building 55), Monash University, Clayton Campus.

READING LIST

Sommerville, Ian. Software Engineering, Eigth 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