

**FIT3056**  
**Secure and trusted software systems**

**Unit Guide**

**Semester 2, 2012**

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: 23 Jul 2012*

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# **FIT3056 Secure and trusted software systems - Semester 2, 2012**

Students are introduced to some of the most common security issues involved in the development of software, including secure coding practices, secure database access, secure data communications, security of web applications, use of encryption techniques and security testing. Students are provided with a range of practical exercises to reinforce their skills, including authenticating and authorising users programmatically, user input validation, developing secure web, mobile/wireless and database applications, encrypting and hashing data programmatically, generating digital signatures programmatically, security testing, designing logging and auditing mechanisms.

## **Mode of Delivery**

Caulfield (Day)

## **Contact Hours**

2 hrs lectures/wk, 2 hrs laboratories/wk

## **Workload**

Workload commitments per week are:

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

## **Unit Relationships**

### **Prerequisites**

FIT1002 and one of FIT1019 or FIT2078

### **Chief Examiner**

Dr Phu Le

### **Campus Lecturer**

#### **Caulfield**

Phu Dung Le

### **Tutors**

## **Caulfield**

**Phu Dung Le**

Consultation hours: Tuesday 2pm - 4pm

# Academic Overview

## Outcomes

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

- some of the main security concepts and issues involved in the development of software, including: Software security versus other aspects of computer security; goals of secure and trusted software; vulnerabilities versus threats; best software development principles and practices; buffer overflows; security of programming platforms; authentication and authorisation; principle of least privilege; security features are not equal to secure features; secure use of encryption; user input validation; reliable software components; data privacy; auditing and logging; security testing;
- the importance of developing secure software in today's electronic world.

Developed the skills to:

- design applications with security in mind;
- validate user input;
- implement secure authentication mechanisms;
- authorise users access to various protected resources;
- encrypt files and hash passwords;
- store session data securely in web applications;
- perform secure database access;
- set up secure transfer of data;
- create security logs;
- test software for security vulnerabilities.

## 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): 60%; In-semester assessment: 40%

**Assessment Task**

**Value**

**Due Date**

20%

## Academic Overview

Assignment 1 - Identify software design and implementation vulnerabilities, and propose solutions		Week 8, Friday 4pm
Assignment 2 - Design and implementation of secure and trusted applications using cryptography either in wired or wireless environments	20%	Week 12, Friday 4pm
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

### 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

Previous feedback from students has shown the importance of this unit as part of the undergraduate degree. Students who did this unit had an advantage in job interviews and when working in software development.

If you wish to view how previous students rated this unit, please go to

<https://emuapps.monash.edu.au/unitevaluations/index.jsp>

## Unit Schedule

Week	Activities	Assessment
0		No formal assessment or activities are undertaken in week 0
1	Introduction to software design and implementation	
2	Computer software security problems and solutions	
3	Computer software security problems and solutions (continued)	
4	Principles of secure software design and implementation	
5	Concurrent programming and software security	
6	Concurrent programming and software security (continued)	
7	Building secure networked and distributed applications	
8	Building secure networked and distributed applications (continued)	Assignment 1 due Week 8, Friday 4pm
9	Building trusted software systems	
10	Secure software testing and verification	
11	Secure software testing and verification (continued)	
12	Research in software security and trusted systems	Assignment 2 due Week 12, Friday 4pm
	SWOT VAC	No formal assessment is undertaken in SWOT VAC
	Examination period	LINK to Assessment Policy: <a href="http://policy.monash.edu.au/policy-bank/academic/education/assessment/assessment-in-coursework-policy.html">http://policy.monash.edu.au/policy-bank/academic/education/assessment/assessment-in-coursework-policy.html</a>

\*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>)

Academic Integrity - Please see the Demystifying Citing and Referencing tutorial at

<http://lib.monash.edu/tutorials/citing/>

## Assessment Tasks

### Participation

- **Assessment task 1**

**Title:**

Assignment 1 - Identify software design and implementation vulnerabilities, and propose solutions

**Description:**

This assignment does not require you to write your own code. You will research and study other people's programs, identify possible vulnerabilities and propose solutions to secure those programs either in wired or wireless environments.

If you analyse the vulnerabilities of the programs correctly in your report and understand the problems well, this will give you 30% of the total marks. Your demonstration will give you another 40% and your proposed security solutions another 30%.

More details will be provided on the Assignment specification.

**Weighting:**

20%

**Criteria for assessment:**

Assessment will depend mainly on how well you can demonstrate a clear understanding of your work, theoretically and practically.

**Due date:**

Week 8, Friday 4pm

- **Assessment task 2**

**Title:**

Assignment 2 - Design and implementation of secure and trusted applications using cryptography either in wired or wireless environments

**Description:**

You will need to complete a programming task with well explained documentation, write a report to explain why your code is secure and meets the requirements of secure and trusted software, demonstrate your program to the tutor, and answer the tutor's questions at an interview.

Your report will give you 30% of the total marks. If your code works and meets the assignment requirements of secure and trusted software, this will give another 50% of the total marks. Your demonstration and answers to interview questions will give you another 20%.



## Assessment Requirements

More details will be provided on the Assignment specification.

**Weighting:**

20%

**Criteria for assessment:**

Assessment will depend mainly on how well you can demonstrate a clear understanding of your work, theoretically and practically.

**Due date:**

Week 12, Friday 4pm

## Examinations

- **Examination 1**

**Weighting:**

60%

**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).

## 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-p>)
- 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](http://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](mailto: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 Community Services at 03 55146018 at Sunway