ITEC855
Security and Forensic Discovery
S1 Evening 2014
Computing

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General Information

Unit convenor and teaching staff
Unit Convenor
Udaya Tupakula
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Contact via udaya.tupakula@mq.edu.au
321, E6A
Monday: 5.00 - 6.00 pm or by appointment

Credit points
4

Prerequisites
COMP342 or COMP343 or COMP347

Corequisites

Co-badged status

Unit description
This unit covers the fundamental technologies and processes that underpin good systems security management within modern organisations. We consider the underlying mechanics of information and communications technology security infrastructures, security requirements, security architectures and models, cryptography, secure protocols, authentication, key management, PKI, access control, auditing and intrusion detection.

Important Academic Dates
Information about important academic dates including deadlines for withdrawing from units are available at http://students.mq.edu.au/student_admin/enrolmentguide/academicdates/

Learning Outcomes

1. Analyse the key security requirements and trends in security of software and interconnected systems
2. Analyse techniques for exploiting software and networks
3. Apply security techniques to mitigate software and network attacks
4. Understand and evaluate security techniques used to deal with the attacks and concepts for providing software assurance
5. Advance skills and clearly communicate concepts related to software security at a postgraduate level.
Assessment Tasks

<table>
<thead>
<tr>
<th>Name</th>
<th>Weighting</th>
<th>Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quiz</td>
<td>25%</td>
<td>Week 6</td>
</tr>
<tr>
<td>Project</td>
<td>25%</td>
<td>Week 11</td>
</tr>
<tr>
<td>Exam</td>
<td>50%</td>
<td>TBC</td>
</tr>
</tbody>
</table>

**Quiz**

Due: **Week 6**  
Weighting: **25%**

Quiz (close book) will be based on your previously covered lecture material for weeks 1-5. The quiz questions will be handed over to you at the beginning of your Lecture class. It will be about 1 hour and consists of multiple choice and short answer questions. Quiz will be followed by discussion on the solutions. Quiz will serve as a feedback mechanism to monitor your progress in the unit.

This Assessment Task relates to the following Learning Outcomes:

- Analyse the key security requirements and trends in security of software and interconnected systems
- Analyse techniques for exploiting software and networks

**Project**

Due: **Week 11**  
Weighting: **25%**

Project Assigned on Week 6

Report: 8%

Content and Understanding: 9%

Presentation: 8%

The task is group based with individual contributions clearly outlined.

Students are expected to contribute in all the components of the project: project report, content and understanding and presentation.

Project reports can be submitted on iLearn (https://ilearn.mq.edu.au/login/MQ)

This Assessment Task relates to the following Learning Outcomes:
• Analyse the key security requirements and trends in security of software and interconnected systems
• Analyse techniques for exploiting software and networks
• Apply security techniques to mitigate software and network attacks
• Understand and evaluate security techniques used to deal with the attacks and concepts for providing software assurance
• Advance skills and clearly communicate concepts related to software security at a postgraduate level.

Exam
Due: TBC
Weighting: 50%

Need to obtain at least 30% in the Exam component to pass the unit.

The exam will be a written exam with some multiple choice and questions from topics covered in the lectures.

It will be held in the usual examination period of the semester. Students have 3 hours written time plus 10 minutes reading time for the exam.

This Assessment Task relates to the following Learning Outcomes:
• Analyse the key security requirements and trends in security of software and interconnected systems
• Analyse techniques for exploiting software and networks
• Apply security techniques to mitigate software and network attacks
• Understand and evaluate security techniques used to deal with the attacks and concepts for providing software assurance
• Advance skills and clearly communicate concepts related to software security at a postgraduate level.

Delivery and Resources

Technology:
• Presentations using Powerpoint
• Other computer related material

Lecture and Tutorial:
• Provided in Unit Schedule
ITEC855 is taught via lectures and sessions.

All unit information will be posted on iLearn (https://ilearn.mq.edu.au/login/MQ/). We assume that students will regularly check iLearn for information regarding lecture notes and other related resources.

It should be noted that no single text book completely covers the content of this unit. Below books are recommended (not compulsory) for the course.

References:

• Gary McGraw, Software Security: Building Security IN, Addison-Wesley
• Stuart McClure, Joel Scambray, George Kurtz, Hacking exposed 7: Network Security Secrets & Solutions, McGraw Hill.
• Building Secure Software, How to avoid security problems the right way, John Viega, Gary McGraw, Addison-Wesley.
• Howard and LeBlanc, Writing Secure Code, Microsoft Press, 2nd edition

Unit Schedule

Week 1  Introduction
Week 2  Software security
Week 3  Software security attacks analysis
Week 4  Network security attacks analysis
Week 5  Penetration testing
Week 6  Quiz and Group project allocation
Week 7  Security techniques & tools-1
Week 8  Security techniques & tools- 2
Week 9  Software assurance techniques
Week 10  Building secure software
Week 11  Group project assessment
Week 12  Revision
Week 13  No lecture (Public Holiday)
Learning and Teaching Activities

Learning Outcome test

this is test

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central. Students should be aware of the following policies in particular with regard to Learning and Teaching:

Academic Honesty Policy http://mq.edu.au/policy/docs/academic_honesty/policy.html
Disruption to Studies Policy http://www.mq.edu.au/policy/docs/disruption_studies/policy.html The Disruption to Studies Policy is effective from March 3 2014 and replaces the Special Consideration Policy.

In addition, a number of other policies can be found in the Learning and Teaching Category of Policy Central.

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/support/student_conduct/

Student Support

Macquarie University provides a range of support services for students. For details, visit http://students.mq.edu.au/support/

Learning Skills

Learning Skills (mq.edu.au/learningskills) provides academic writing resources and study strategies to improve your marks and take control of your study.

- Workshops
- StudyWise
- Academic Integrity Module for Students
- Ask a Learning Adviser
Student Enquiry Service
For all student enquiries, visit Student Connect at ask.mq.edu.au

Equity Support
Students with a disability are encouraged to contact the Disability Service who can provide appropriate help with any issues that arise during their studies.

IT Help
For help with University computer systems and technology, visit http://informatics.mq.edu.au/help.

When using the University’s IT, you must adhere to the Acceptable Use Policy. The policy applies to all who connect to the MQ network including students.

Graduate Capabilities

PG - Discipline Knowledge and Skills
Our postgraduates will be able to demonstrate a significantly enhanced depth and breadth of knowledge, scholarly understanding, and specific subject content knowledge in their chosen fields.

This graduate capability is supported by:

Learning outcome

- Analyse the key security requirements and trends in security of software and interconnected systems

Assessment tasks

- Quiz
- Project
- Exam

PG - Critical, Analytical and Integrative Thinking
Our postgraduates will be capable of utilising and reflecting on prior knowledge and experience, of applying higher level critical thinking skills, and of integrating and synthesising learning and knowledge from a range of sources and environments. A characteristic of this form of thinking is the generation of new, professionally oriented knowledge through personal or group-based critique of practice and theory.

This graduate capability is supported by:
Learning outcomes

• Analyse the key security requirements and trends in security of software and interconnected systems
• Analyse techniques for exploiting software and networks
• Apply security techniques to mitigate software and network attacks

Assessment tasks

• Quiz
• Project
• Exam

PG - Research and Problem Solving Capability

Our postgraduates will be capable of systematic enquiry; able to use research skills to create new knowledge that can be applied to real world issues, or contribute to a field of study or practice to enhance society. They will be capable of creative questioning, problem finding and problem solving.

This graduate capability is supported by:

Learning outcomes

• Understand and evaluate security techniques used to deal with the attacks and concepts for providing software assurance
• Advance skills and clearly communicate concepts related to software security at a postgraduate level.

Assessment tasks

• Project
• Exam

PG - Effective Communication

Our postgraduates will be able to communicate effectively and convey their views to different social, cultural, and professional audiences. They will be able to use a variety of technologically supported media to communicate with empathy using a range of written, spoken or visual formats.

This graduate capability is supported by:

Learning outcomes

• Analyse the key security requirements and trends in security of software and interconnected systems
• Understand and evaluate security techniques used to deal with the attacks and concepts for providing software assurance
• Advance skills and clearly communicate concepts related to software security at a postgraduate level.

Assessment tasks

• Project
• Exam

PG - Engaged and Responsible, Active and Ethical Citizens

Our postgraduates will be ethically aware and capable of confident transformative action in relation to their professional responsibilities and the wider community. They will have a sense of connectedness with others and country and have a sense of mutual obligation. They will be able to appreciate the impact of their professional roles for social justice and inclusion related to national and global issues

This graduate capability is supported by:

Learning outcomes

• Analyse the key security requirements and trends in security of software and interconnected systems
• Advance skills and clearly communicate concepts related to software security at a postgraduate level.

Assessment task

• Project

PG - Capable of Professional and Personal Judgment and Initiative

Our postgraduates will demonstrate a high standard of discernment and common sense in their professional and personal judgment. They will have the ability to make informed choices and decisions that reflect both the nature of their professional work and their personal perspectives.

This graduate capability is supported by:

Learning outcomes

• Apply security techniques to mitigate software and network attacks
• Understand and evaluate security techniques used to deal with the attacks and concepts for providing software assurance
• Advance skills and clearly communicate concepts related to software security at a postgraduate level.
## Assessment tasks

- Project
- Exam

## Standards

<table>
<thead>
<tr>
<th>Grade</th>
<th>Learning Outcome 1</th>
<th>Learning Outcome 2</th>
<th>Learning Outcome 3</th>
<th>Learning Outcome 4</th>
<th>Learning Outcome 5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Security Requirements</td>
<td>Security Attacks</td>
<td>Security Techniques</td>
<td>Software Assurance</td>
<td>Critical thinking and communication skills</td>
</tr>
</tbody>
</table>

<p>| HD     | Demonstrates deep and critical understanding of the security requirements and shows originality in the analysis and evaluation. | Critical understanding of the security attacks and root cause identification and analysis of the attacks. | Deep understanding of the security techniques, ability to design and develop security solutions to deal with the security attacks. Shows originality in the application of security technique and evaluate their effectiveness | Novel use of the security techniques and excellent understanding of concepts for building secure software and improving software assurance. | Demonstrate original ideas, superior analysis and effective communication skills on the issues related to complex problems. |</p>
<table>
<thead>
<tr>
<th>Grade</th>
<th>Demonstrate good understanding and shows some originality in their analysis.</th>
<th>Good understanding of the security attacks and ability to relate them with the weakness in software and networks.</th>
<th>Good understanding of the security techniques, ability to design and develop security solutions and perform their analysis.</th>
<th>Good understanding of the concepts for building secure software and improving software assurance.</th>
<th>Demonstrate deep insights, and effective communication on the issues related to complex problems.</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>Reasonable understating of the security requirements and able to describe them.</td>
<td>Clear understating of the security attacks and able to analyse the attacks.</td>
<td>Reasonable understating of the security techniques, ability to apply them to counteract attacks.</td>
<td>Reasonable understating of the concepts for building secure software and improving software assurance.</td>
<td>Provides evidence of clear understanding and good communication on the issues related to complex problems.</td>
</tr>
<tr>
<td>Credit</td>
<td>Basic understanding of some of the security requirements</td>
<td>Basic understanding of the security attacks</td>
<td>Basic understanding of the security techniques and ability to apply them to counteract some of the attacks.</td>
<td>Some understanding of the concepts for building secure software and improve software assurance.</td>
<td>Provides evidence of some understanding and able to present on the issues related to complex problems.</td>
</tr>
<tr>
<td>Pass</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Grading

At the end of the semester, you will receive a grade that reflects your achievement in the unit.

- **Fail (F):** does not provide evidence of attainment of all learning outcomes. There is missing or partial or superficial or faulty understanding and application of the fundamental concepts in the field of study; and incomplete, confusing or lacking
communication of ideas in ways that give little attention to the conventions of the discipline.

- **Pass (P):** provides sufficient evidence of the achievement of learning outcomes. There is demonstration of understanding and application of fundamental concepts of the field of study; and communication of information and ideas adequately in terms of the conventions of the discipline. The learning attainment is considered satisfactory or adequate or competent or capable in relation to the specified outcomes.

- **Credit (Cr):** provides evidence of learning that goes beyond replication of content knowledge or skills relevant to the learning outcomes. There is demonstration of substantial understanding of fundamental concepts in the field of study and the ability to apply these concepts in a variety of contexts; plus communication of ideas fluently and clearly in terms of the conventions of the discipline.

- **Distinction (D):** provides evidence of integration and evaluation of critical ideas, principles and theories, distinctive insight and ability in applying relevant skills and concepts in relation to learning outcomes. There is demonstration of frequent originality in defining and analysing issues or problems and providing solutions; and the use of means of communication appropriate to the discipline and the audience.

- **High Distinction (HD):** provides consistent evidence of deep and critical understanding in relation to the learning outcomes. There is substantial originality and insight in identifying, generating and communicating competing arguments, perspectives or problem solving approaches; critical evaluation of problems, their solutions and their implications; creativity in application.

In this unit, your final grade depends on your performance in each part of the assessment. For each task, you receive a mark that combines your standard of performance regarding each learning outcome assessed by this task. Then the different component marks are added up to determine your total mark out of 100. Your grade then depends on this total mark and your overall standards of performance.

Concretely, in order to pass the unit, you must

- obtain a total mark of 50% or higher and a mark of 30% or higher in the final examination;
- make a reasonable attempt at the exercises in the assessment tasks;
- demonstrate that you can perform at a Functional level or higher for each criterion assessed in the Quiz and Group Project/Presentation.
- reach a Functional level or higher for each criterion assessed in the final examination.
Students obtaining a higher grade than a pass in this unit will (in addition to the above)

- have a total mark of 85% or higher and perform at distinction level or higher in the final examination to obtain High Distinction;
- have a total mark of 75% or higher and perform at credit level or higher in the final examination to obtain Distinction;
- have a total mark of 65% or higher and perform at pass level but with 50% or higher in the final examination to obtain Credit.