ITEC855
Security Technologies and Forensic Analysis
S1 Evening 2017
Dept of Computing

Contents

General Information ........................................... 2
Learning Outcomes .......................................... 2
General Assessment Information ...................... 2
Assessment Tasks ........................................... 3
Delivery and Resources .................................... 4
Unit Schedule ................................................ 5
Policies and Procedures .................................... 6
Graduate Capabilities ........................................ 7
Grading .......................................................... 10

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General Information

Unit convenor and teaching staff
Udaya Tupakula
udaya.tupakula@mq.edu.au

Credit points
4

Prerequisites
COMP343 or ITEC647

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, risk management, attack modelling, software security, firewalls, intrusion detection and forensics.

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

Learning Outcomes

1. Analyse the key security requirements and trends in software security and interconnected systems
2. Analyse techniques for exploiting software and networks
3. Design and/or apply security techniques to mitigate software and network attacks
4. Evaluate security techniques used to deal with the attacks
5. Present and discuss concepts related to software and network security at a postgraduate level

General Assessment Information

Hurdle assessments:

• Students will have to obtain at least 45% in the final exam to be eligible to pass the unit.
• A second attempt will be provided for students that get in the band 35%-45% in the final
Assessment Tasks

<table>
<thead>
<tr>
<th>Name</th>
<th>Weighting</th>
<th>Hurdle</th>
<th>Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quiz</td>
<td>10%</td>
<td>No</td>
<td>Week 5, 27/03/2017</td>
</tr>
<tr>
<td>Project</td>
<td>30%</td>
<td>No</td>
<td>Week 11, 22/05/2017</td>
</tr>
<tr>
<td>Exam</td>
<td>60%</td>
<td>Yes</td>
<td>TBC</td>
</tr>
</tbody>
</table>

Quiz

Due: **Week 5, 27/03/2017**
Weighting: **10%**

Due: 27/03/2017 (Week 5) Weighting: 10% Quiz (closed book) will be based on your previously covered lecture material for weeks 1-4. 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 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 software security and interconnected systems
- Analyse techniques for exploiting software and networks

Project

Due: **Week 11, 22/05/2017**
Weighting: **30%**

Due: 22/05/2017 Weighting: 30% Group project with 2-3 students per group. Projects will be related to security issues with emerging technologies such as smart grid and cloud. The project reports are due on 22nd May 2017; 11:59 AM (electronically). In addition, each group is allocated a time slot for presenting their work during Week 11 (22nd May 2017) OR Week 12.
(29th May 2017). Each student in the group is expected to present their work which will be followed by QA session. The QA session will be conducted by the panel (which includes convener and/or other staff members and/or PhD students within the computing department). The presentation and QA session will help the panel to evaluate the individual contribution of each student. The Project will account to 30% (Report-10%, Presentation-10% and QA-10%) of the marks.

This Assessment Task relates to the following Learning Outcomes:

• Analyse the key security requirements and trends in software security and interconnected systems
• Analyse techniques for exploiting software and networks
• Design and/or apply security techniques to mitigate software and network attacks
• Evaluate security techniques used to deal with the attacks
• Present and discuss concepts related to software and network security at a postgraduate level

Exam

Due: TBC
Weighting: 60%
This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)

Due: TBC Weighting: 60% Need to obtain atleast 45% in the Exam component to pass the unit. The exam will be a written exam with 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 software security and interconnected systems
• Analyse techniques for exploiting software and networks
• Design and/or apply security techniques to mitigate software and network attacks
• Evaluate security techniques used to deal with the attacks

Delivery and Resources

Technology:

• Presentations using Powerpoint
• Other computer related material

Lecture and Tutorial:
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
- Building Secure Software, How to avoid security problems the right way, John Viega, Gary McGraw, Addison-Wesley.

Unit Schedule

<table>
<thead>
<tr>
<th>S.No</th>
<th>Date</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1</td>
<td>27/02</td>
<td>Introduction</td>
</tr>
<tr>
<td>Week 2</td>
<td>06/03</td>
<td>Risk management framework for systems security</td>
</tr>
<tr>
<td>Week 3</td>
<td>13/03</td>
<td>Software security attacks</td>
</tr>
<tr>
<td>Week 4</td>
<td>20/03</td>
<td>Network security attacks</td>
</tr>
<tr>
<td>Week 5</td>
<td>27/03</td>
<td>Quiz, Solutions, Penetration Testing</td>
</tr>
<tr>
<td>Week 6</td>
<td>03/04</td>
<td>Lab 1-Attack Tools</td>
</tr>
<tr>
<td>Week 7</td>
<td>10/04</td>
<td>Security techniques &amp; tools; Group project assigned</td>
</tr>
<tr>
<td>Break</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Week 8</td>
<td>01/05</td>
<td>Advanced security techniques for software systems</td>
</tr>
<tr>
<td>Week 9</td>
<td>08/05</td>
<td>Advanced security techniques for networks</td>
</tr>
<tr>
<td>Week 10</td>
<td>15/05</td>
<td>Software assurance / Lab 2- Security Tools</td>
</tr>
<tr>
<td>Week 11</td>
<td>22/05</td>
<td>Group project assessment</td>
</tr>
<tr>
<td>Week 12</td>
<td>29/05</td>
<td>Group project assessment</td>
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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:


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/]

Results

Results shown in iLearn, or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in eStudent. For more information visit [ask.mq.edu.au](http://mq.edu.au).

Student Support

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

Learning Skills

Learning Skills ([mq.edu.au/learningskills](http://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
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 outcomes

- Analyse the key security requirements and trends in software security and interconnected systems
- Analyse techniques for exploiting software and networks
- Design and/or apply security techniques to mitigate software and network attacks
- Evaluate security techniques used to deal with the attacks

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 software security and interconnected systems
- Analyse techniques for exploiting software and networks
- Design and/or apply security techniques to mitigate software and network attacks
- Evaluate security techniques used to deal with the 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**

- Analyse the key security requirements and trends in software security and interconnected systems
- Design and/or apply security techniques to mitigate software and network attacks
- Evaluate security techniques used to deal with the attacks

**Assessment tasks**

- Quiz
- 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 outcome

• Present and discuss concepts related to software and network security at a postgraduate level

Assessment task

• Project

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 outcome

• Analyse techniques for exploiting software and networks

Assessment tasks

• Quiz
• Project
• Exam

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

• Analyse the key security requirements and trends in software security and interconnected systems
• Design and/or apply security techniques to mitigate software and network attacks
• Evaluate security techniques used to deal with the attacks

Assessment tasks

• Quiz
• Project
• Exam
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 45% 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.