COURSE OUTLINE COMP6[84]41

Security Engineering and Cyber Security

UNSW Class of 2019 Term 2
COMP6441/6841 19T2
v2.3

About

Introduction to computer security, prevention of cybercrime and cyberterror. The principles of engineering secure systems. How to think like a security engineer.

Engineering secure systems. How security fails. Security analysis and design. Private and public cryptographic protocols. Introduction to information security: Confidentiality, Integrity, Authentication, Non-repudiation, hashing, signatures, bits of security. Physical security, social engineering, sniffing, intrusion detection, prevention and response, firewalls, honeypots. Overview of vulnerabilities and exploits including areas such as buffer overflow, inter overflow, heap attacks, Return-Oriented-Programming, heap attacks. Principles of risk and security. Case studies drawn from the history of hacking and from current events.

Additional topics drawn from recent developments and current research in applied computer security.

There are numerous formative assessments and activities throughout the course to provide feedback and learning opportunities. These do not directly contribute to your final grade but are expected to be used to provide evidence of your capabilities in your portfolio.

A programming background is not required but it will be helpful in some of the more applied topics. Students need a keen devious and analytical mind. To get the most from this course students will need to engage in independent study and research and be able to act as independent self-directed learners.

Course People

Course Administrator

Lachlan Jones

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LiC

Richard Buckland

Lectures:

COMP6441

- Tue - 10:00 - 12:00 - Richard Buckland
- Tue - 18:00 - 20:00 - Richard Buckland

COMP6841

- Tue - 10:00 - 12:00 - Richard Buckland
- Tue - 18:00 - 21:00 - Richard Buckland

Security Theatre

- Tue - 20:00 - 22:00 - Film of Choice
  - This is an optional component of the course

Analysis sessions:

The weekly small group sessions you attend are your Analysis sessions, although myUNSW and other sites may refer to them as labs or tutorials. Every student must attend their analysis class each week and participate.

The Analysis sessions are mixed classes between COMP6441 and COMP6841.

Assumed Knowledge

6441 - You need to be able to work independently and be self directed. You need to asses your own development and notice when you have gaps and then take responsibility for teaching yourself what you need to know to fill the gaps. Formally you are required to have successfully completed one year of full time university study already.

Prerequisite: Completion of 48 UOC

If there is room in the course and if you can demonstrate you have learning maturity and are capable of appropriate levels of self direct study, we may waive this prerequisite.

While there are no formal requirements for this course, basic understanding of one or more of the following topics is useful:

- Programming/Computing
- Some algebra/discrete mathematics
- Operating Systems
- Computer networks
- Critical thinking

Only small amounts of knowledge may be required from these topics, but students that lack the above knowledge must be prepared to study these by themselves if they find certain content of the course challenging. Students are encouraged to ask their tutors for advice if in doubt.

6841 - As for 6441 PLUS knowledge of programming (ideally `C`) and basic computer internals (memory usage, data processing/storage).

Prerequisite: Completion of 48 UOC, and (COMP1927 or COMP2521)

Assessment

40% - Final exam
20% - Mid-semester exam (week 5)
40% - Job Applications (weeks 8,9,10)
5% - Bonus Marks - yes you can score over 100! (..but we'll truncate it at 100)

Oooh Bonus Marks

A Bonus mark for every time your work is showcased in the Hall of Fame. Impressive write-ups, lightning presentation, diary entries, anything impressive you post on the course site (OpenLearning) is eligible for showcasing.

Two Streams

COMP6441/COMP6841 are taught in parallel. The lectures are common for both courses, with the exception of Tue 18:00-19:00 which is for extended students. Students from COMP6441 are encouraged to attend, these lectures will focus on a more technical approach to security and how it breaks. Analysis groups are allocated regardless to which course the student is enrolled in. COMP6441 does not have much compulsory technical content - but you can chose technical options if you like. COMP6841 has compulsory technical content and will be assessed at a higher standard. Tutors may or may not choose to allocate a section of each weeks analysis session to more technical content.

Lectures (weekly, 3-4 hours)

Weekly lectures are meant to introduce students to new topics and material. The lecturer may also suggest students do optional weekly activities for homework, this may not be written down anywhere, so students are encouraged to take notes and share and discuss amongst each other.

Each week, a different analysis group is expected to take collaborative notes for the course textbook, these must be uploaded by Thursday lunchtime, after which time all students in the course can read and further edit and improve them. These collaborative notes are compiled and edited (with some restrictions) into the class textbook which will be made available to you in the final exam.

You are encouraged to actively participate with questions, answers and relevant comments in lectures.

Analysis sessions (weekly, 2 hours)

In the weekly analysis sessions you will work with the same small groups of around 20 students each week. The classes will dive into case studies related to security engineering, failures and successes, and the mindset behind good security engineering. Students are expected to take notes and be actively contributing.

These sessions are also the time and place to present your lightning talks (short, 5-10 min presentations) on a topic that you find interesting. These are meant to be mini introductions to the rest of the class.

Additionally, some minutes every week should be dedicated to Security Everywhere, where the class discusses recent security related news, and other relevant things you may have seen/experienced/heard over the past week. The class is meant to discuss these topics. On the discretion of the class leader, additional revision/exercises/material may be introduced. Students are expected to have done all relevant reading for each case study before the weekly session.

Homework exercises

We expect security students to do their homework and to manage your time effectively. This ranges from informal homework tasks given by the lecturer in lectures (remember to take notes of this), weekly security everywhere posts, writing blog posts about them, working on job application, etc.

Self directed study

We expect students to spend a significant time on self directed studies related to security. This ranges from reviewing lecture materials, learning related content, to going to security meetups, playing ctf's or doing bug bounties. This may also include your something awesome project. Remember to blog about it so you get more evidence for your portfolio - remember we would like to see, not be told.

Breakdown of time

Students are recommended to dedicate 15 hours a week on this subject in order to achieve a credit. This is just a rough guide. We suggest the following as a breakdown of the weekly 15 hours one should spend in order to attain a credit:

4 h - Lecture
2 h - Tutorial
3 h - Homework exercises
5 h - Self directed studies
1 h - Tutorial preparation

The above breakdown may not include extra time required for COMP6841 studies.

Course textbook

There is a collaborative course textbook online to which you are expected to contribute and which will be made available to you in the final exam. Each week, one tutorial class will be designated to write notes from the lecture (see relevant tutorial timetable). Those notes will be the basis of the textbook content for the topics covered that week. However, all students are expected to review, contribute and extend the content that is added to the textbook every week, regardless of which tutorial class they are in.

Submitted work is shared by default

This is an open course and we frequently share student submitted material for others to see and learn from. In this course submitting work means you give the university a perpetual royalty free license to use the submitted material in any way it wishes. This includes but is not limited to comments, assignments, questions, messages, uploaded content, exams, wiki text and activity submissions. If submission sharing might impact on your learning in the course please discuss this with us before you submit.

Good Faith Policy

This course has a "Good Faith Policy". This means we expect you to act in good faith at all times. We expect you to be a good citizen. To not invade, alter or damage the property of others including the university , invade the privacy of others, break any laws or regulations, annoy other people, deprive others of access to resources, breach or weaken the security of any system, or do or omit to do anything else which you know or suspect we would not be happy about. Furthermore you are not to do anything which appears OK by a loophole or a strict interpretation of "the letter of the law" but which is not consistent with the spirit. Basically you must not act in any way so as to bring disrepute to the reputation of the course, the course staff, fellow students, the school, the university, or the ICT profession. Also, don't be a dick.

If you are unsure, ask!

If, in our sole discretion, we feel you have violated the Good Faith Policy you will be awarded a '0 Fail' for the course. Further penalties may apply also depending on the nature and severity of the violation. Students who have violated the Good Faith Policy may not be permitted to re-enrol in future offerings of the course.

Students who are found (or who have previously been found and have not disclosed this) guilty of academic or computer related misconduct or any other activity in a way which which casts doubt on their ability or willingness to comply with the Good Faith Policy will be dis-enrolled and will be not permitted to re-enroll in future offerings of the course. If you have ever been found guilty of such an activity you must disclose it to the lecturer in writing immediately.

Plagiarism

UNSW takes plagiarism very seriously and if you are found to have engaged in plagiarism there are terrible penalties. Plagiarism at UNSW means using the words or ideas of others without giving clear credit ie passing them off as your own.

You must (and you really should) read the full text of UNSW's policy regarding academic honesty and plagiarism.

The pages below describe the policies and procedures in more detail:

- Student Code Policy

- Plagiarism Policy Statement
- Plagiarism Procedure
- Student Misconduct Procedure
- Course Evaluation and Development

We strongly encourage students to actively provide feedback about the course's progress.

These courses will be evaluated by UNSW's myExperience program. You'll receive an email to your student email address with instructions on completing this; we'll also (endeavor to) send out a notification.

But mainly just tell your class rep, your tutor, course admin, or Richard if you ever have any concerns or feedback so we can sort out any problems when they are happening rather than waiting until the end of the course when it could be too late.

Public MOOC

We may public students to join in with us as we move through this course. Please treat them with kindness and welcome them. I believe this will result in a much richer course for everyone. They will watch lectures via video (from previous years). We may also add some of the videos from this year - where I do a better job of explaining something (depending on our video editing and uploading speed).

Keeping Informed

Subscribe to this page to be informed when people comment on it. I'll comment on it whenever I update it or clarify something which is unclear. You can see what (if anything) has changed by clicking on the "history" button below.

Important notices related to this course may be announced on the home page on the course web site from time to time. It is your responsibility to check this site regularly. You can configure email alerts when announcements are posted. The web site is linked from https://www.openlearning.com/courses/securityengineering19t2.

Sometimes urgent information may also be sent to you by email. Make sure you pay careful attention to any email you receive. All official email will be sent to your UNSW email address. If you prefer to read your mail at some other address you will need to redirect your mail, for example by using IDM.

Additional information will be provided in the course discussion forums and elsewhere on the course site as the session progresses. You should explore the course web site, and read the announcements, tagged comments, FAQ, and this page regularly for updates.

Marks may be scaled to ensure a consistent standard from session to session.

If you do not pass the invigilated final exam your final mark for the course will be capped at your exam mark.

Final exam

Held in the examination period.

Mid-Semester exam

Held in week 5, date/time to be decided.

Final Job Application

- Job Advertisement
Due end week 8.

Other activities

There are a number of course activities you are expected to undertake - these are for your own benefit and learning and for the community and do not contribute directly to your final grade. However your Job Application will refer to your performance impact and time management in undertaking these activities so it is important to treat them seriously and stay on top of the course each week.

Analysis sessions

Analysis sessions start in week 1. You will have booked your session slot online when you enrolled (The UNSW system may have called it a "Lab" or a "Tutorial"). Check times and places shortly before the course starts since available times may have subsequently changed.

Some of the sessions will involves some pre-reading, which you must do before attending the session. In those sessions you will discuss the reading for that week.

Some weeks there will also be some analysis questions and exercises to help you practice your analytical skills. The questions will usually be released shortly before the class, bring a printout of the questions along with you to the session with you.

Some questions in the final exam will be related to the analysis session case studies, exercises, and pre-readings.

Your analysis session is an important opportunity to practice and prepare for the final exam.

For scheduling information please refer to:

- http://timetable.unsw.edu.au/2019/COMP6441.html
- http://timetable.unsw.edu.au/2019/COMP6841.html

Examinations

The mid-semester and final examinations in this course may examine any material covered in lectures, seminars, reports, analysis session, homework exercises, and any reading you have been given. One of the final exam questions may relate to a film which you will need to watch and think about before the exam. The particular film will be identified before the start of the exam period.

Supplementary Exam

A supplementary examination will be held soon after the results have been released. If you think that you may be eligible for the Supplementary Examination, make sure you are available around that time. Be careful not to plan any overseas travel at that time. If you can't attend the sup exam you will not be offered a second chance. WE CAN ONLY RUN ONE SUP EXAM.

It is your responsibility to check your email, the CSE website, and to contact the CSE student office for details of Supplementary Examinations. If you think there is any chance you might be eligible for a Supplementary Exam then you should prepare for it. Requests such as "I didn't find out until the day before the sup exam that I could sit the sup exam, so I need more time to study" or "I have to go overseas at that time and I have already purchased the tickets so can you write and administer a special sup exam just for me" will not be granted.

Special Consideration

If your work in this course is affected by unforeseen adverse circumstances, you should apply for Special Consideration. If your request is reasonable and your work has clearly been impacted, then

- for an assignment, you may be granted an extension
- for the Final Exam, you may be offered a Supplementary Exam

Note the use of the word "may". None of the above is guaranteed. It depends on you making a convincing case that the circumstances have clearly impacted your ability to work.

UNSW handles special consideration requests centrally (in the Student Lifecycle division), so all special consideration requests must be submitted via the UNSW Special Consideration website.

Special consideration requests must be accompanied by documentation, which will be verified by Student Lifecycle. Do not email the course convenor directly about special consideration.

If you cannot attend the Final Exam because of illness or misadventure, then you must submit a Special Consideration request, with documentation, through MyUNSW within 24 hours of the exam. If your request is reasonable, then you will be awarded a Supplementary Exam

Note that UNSW expects you to be available to sit Supplementary Exams (held in the week Sep 9-13) if required. If you are awarded a Supplementary Exam and do not attend, then your exam mark will be zero.

For further details on special consideration, see the UNSW Student website .

If you are registered with Disability Services, please forward your documentation to Course Convenor within the first two weeks of term.

Check Your Marks

You can inspect the current state of your mark record by using the command `6441 classrun -sturec` . Check your record frequently and make sure you contact us promptly if you do not agree with it.

All marks must be finalised by the beginning of exam period. If you think there is a problem with any of your marks (e.g. Mid Job Application, Final Job Application, Mid Exam) then you need to advise us by emailing cs6441@cse.unsw.edu.au within two weeks of the mark being released, and, in all cases before the end of stuvac. No marks will be changed after the end of stuvac.

Policies and Rules

The university has a number of rules and policies which affect you (see the university calendar and the university home page), additionally the school of CSE has a number of rules and policies (eg see the "Yellow form"), and this course has a number of rules and policies (see this page). Where there is a conflict between these sets of rules and policies the most strict shall apply. Where there is ambiguity in the interpretation of any rule of policy the most strict interpretation shall apply. If you are in any doubt as to the meaning, interpretation, or effect of any rule or policy please ask the course

administrator or the lecturer in charge.

Getting Help

If you need admin help contact your tutor in the first instance, and the course admin (cs6441@cse.unsw.edu.au or cs6841@cse.unsw.edu.au) if your tutor cannot help you. If you need help with the subject material you ask on the course site where another student or the course staff will likely be able to help you.

In this course we communicate on the course website rather than by email. Richard is able to stay back after the lecture if you have any problems you would rather discuss face to face.