Unit Outline: KXA453 Advanced Computer Security

Semester 1, 2006
Sandy Bay Campus, Hobart
Newnham Campus, Launceston

Prerequisites
None

Corequisites
None

Unit Weight
12.5% of one academic year

Unit Coordinator
Jacky Hartnett

Details of Teaching Arrangements
Seminars: 3 hr/wk
The Unit Timetable can be accessed from the Study Resources section of the School website. ([http://www.comp.utas.edu.au/app/studyresources.jsp](http://www.comp.utas.edu.au/app/studyresources.jsp)).
All sessions are delivered via video conference. There will be 2 times 2 hour sessions in each of the weeks when student papers are read. For information about videoconferencing at UTAS and how to participate effectively, see the Students' guide to Videoconferencing available at: [http://www.utas.edu.au/ltr/videoconf/StudentGuide2004.pdf](http://www.utas.edu.au/ltr/videoconf/StudentGuide2004.pdf) or follow the Service desk link from the Current Students homepage>Videoconferencing.

Unit Website
The unit website is accessed from [http://www.utas.edu.au/coursesonline/](http://www.utas.edu.au/coursesonline/). You will need to use your university email pop account username and password to log on to the WebCT system. Once authenticated by the system your personalised MyWebCT area will be displayed. It contains links to the websites that you have permission to access - including the website for this unit.
This unit is Web Dependent: content. This means that you will need to use the Web for this unit. The unit website contains unit information and resources.
If you are not able to access the unit website, please contact the University IT help desk:
Enterance Level, Morris Miller Library, Sandy Bay Campus;
Enterance Level, Launceston Campus Library, Newnham Campus.
Telephone: 6226 1818 and 1300 304 903.
The 1300 number is a local call from within Tas, with the exception of mobiles.
Email: servicedesk@utas.edu.au

University Website
Information and Resources for 'Current Students' are available on the university website at: [http://www.utas.edu.au/students/](http://www.utas.edu.au/students/)

Provider
School of Computing - Faculty of Science, Engineering, and Technology.

OVERVIEW

Introduction
Provides a detailed exploration of the techniques available to protect computer systems against possible threats and to investigate further methods of protecting computer systems. Topics include the use of cryptography to achieve security goals, approaches to operating system security, and network security. Students have the opportunity to explore current issues in security and develop resources to enable them to keep abreast of these as they change.

Prior Learning
It is useful if students have studied the following:
- the characteristics of the three types of encryption algorithms commonly used in computer security protocols
- the fundamentals of operating system design
- networking basics, especially TCP/IP
- an overview of the operation of one Internet security protocol

Learning Outcomes
On successful completion of this unit, you will be able to:
1. Understand the characteristics and appropriate applications of cryptographic algorithms
2. Discuss the concepts and models used in operating system security
3. Explain one network security protocol and its ability to achieve a particular security goal
4. Explain the relevant security advantages and disadvantages of PKI systems and how
implementation decisions affect these
5. Discuss security problems related to the use of the Internet
6. Research and prepare papers on provided topics and discuss the issues these raise.

Unit Content

- Revision of Basics:
  - Encryption algorithms
  - Authentication
  - Operating system security
- Implementing a Certificate Authority
  - Design decisions for components
  - Creating and using certificates
  - Revoking certificates
- Operating system security models
- Secure network protocols
- Internet security issues

For more information see the section titled 'Content' on the unit website.

Generic Skills

The university has defined a set of generic graduate attributes expected in its graduates. [http://www.utas.edu.au/policy/subject.html#graduates](http://www.utas.edu.au/policy/subject.html#graduates) Your course is designed to enable you to develop generic skills that are valued in, and expected of, graduates. These are skills that you will need to develop over time. Hence you are encouraged to look for opportunities, as you study each unit, to reflect on and improve these skills.

Knowledge: This unit requires students to research a computer security topic in depth, by themselves. As such it particularly develops the ability to:

- Apply technical and information skills appropriate to the discipline or professional area;
- Use a wide range of academic skills (research, analysis, synthesis etc);
- Understand the limitation of, and have the capacity to evaluate, their current knowledge;
- Identify, evaluate and implement personal learning strategies;
- Learn new skills and apply learning to new and unexpected situations;
- Work effectively with others;
- Find, acquire, evaluate, manage and use relevant information in a range of media.

Problem Solving Skills: This unit will involve working in a team to set up security software. This will involve making decisions about the relevant security attributes and how these achieve specific security goals. Condensing the amount of material available for the research papers. These tasks will enable students to develop the abilities listed on the university website, including:

- Demonstrate oral, and written communication;
- Present well-reasoned arguments, using technology as appropriate;
- Access, organise and present information, particularly through technology-based activity;
- Listen to and evaluate the views of others.

Learning and Teaching

You are expected to spend about 130 hrs studying in this unit - this includes attendance at scheduled teaching sessions. (For a 13 week semester this is, on average, 10 hr/wk.) This is the amount of study time that the 'typical' student will need to reach the level of competence and understanding required to fulfil the unit objectives.

You are expected to:

- attend all scheduled seminars, unless otherwise notified by the unit coordinator
- prepare for, and actively participate in seminars
- complete the assigned learning tasks
- review what has been learnt
- complete assessment items and submit them on time
- access and be familiar with the information and resources available on the unit website
- seek help from teaching staff if you have any questions or difficulties in studying this unit

This unit is studied as a co-operative learning group led by the lecturer. Students are expected to share their understanding of issues both in class and outside of it, and co-operate with the sharing of resources. However, the work that students submit for assessment must be an individual expression of that co-operative learning.

Although four hours of class are scheduled for each week the average class time will be three hours per week, with attendance requirements for each week established by negotiation with the class.
You are encouraged to read the university's Code of Conduct for Teaching and Learning. Part A describes the 'Responsibility of the University to Students' and part B describes the 'Responsibilities of Students to the University'. [http://www.utas.edu.au/ti/policies/codes.html](http://www.utas.edu.au/ti/policies/codes.html)

### Schedule

See the 'Schedule' section on the unit website.

### Teaching and Support Staff

#### Teaching Staff

**Unit Coordinator:**

Jacky Hartnett  
E-Mail: J.Hartnett@utas.edu.au  
Phone: (03) 6324 3392  
Room: V120, Newnham Campus, Launceston

#### School Help Desk

Contact the School Help Desk if you have any queries or problems with accessing, using, or printing from the computers in the School of Computing labs.

- **Hobart:** the Help Desk is located near the School's reception desk and is open from 10am - 4pm Monday-Friday. The phone number is 6226 2960.

- **Launceston:** the Help Desk is located near the entrance to the computing labs and is open in the morning from 10am - 12pm, and in the afternoon from 2pm - 4:30pm, Monday-Thursday. On Fridays it is open from 10am - 12pm in the morning and 2pm - 4pm in the afternoon. The phone number is 6324 3447.

- **Burnie:** the computer labs at the NWC are maintained by ITS. Please contact the University Help Desk for assistance. The 6 Macs are maintained by the School of Computing. If you have a query or problem that is specific to the School of Computing please phone the School of Computing Help Desk in Launceston.

#### University Services and Support

The University has staff available to assist you, such as the:

- Learning Development Advisor  
- Student Counselor  
- Careers Advisor  
- Disability Officer

For more information and contact details see the Services and Support section on the University 'Current Students' web page. [http://www.utas.edu.au/students/](http://www.utas.edu.au/students/)

### Resources

#### Unit Website

The unit website contains unit information and resources. You will be informed at the seminars when and if essential material is available only via this website.

#### Prescribed Text


#### Readings

Information about other references and access to them will be discussed in the seminars.

#### Software

The software that you will need to access the unit website and to study this unit, including general purpose software such as word processors, is provided on the computers in the School's computing labs. If you intend to use software on other computers please check that the versions are compatible.

It is expected that all students will install PGP on their school machines and use it for their communications about the unit. PGP software is available on the 2006 School of Computing CD that may be borrowed or purchased from the Help Desk.

You will also be creating a Certificate Authority using Java and writing small applications to use these certificates. Software to help with this can be downloaded from: [http://www.devx.com/Java/Article/10185](http://www.devx.com/Java/Article/10185)
Computing Facilities

The School has PC labs (Windows XP), Mac labs (Mac OS-X 10.4), and Networking labs at the Newnham and Sandy Bay campuses. It also maintains 6 Macs (Mac OS-X 10.4) at the NW Centre. Unix accounts can be accessed from all Macs and PCs.

If you have not used these facilities before please contact the School Help Desk to organise your account details. If you would like to access the facilities at the Newnham and Sandy Bay campuses after hours please contact the School Help Desk.

Please contact the School Help Desk if you have difficulty accessing or using these facilities.

Use of Facilities

Use of computing facilities provided by the School is subject to the School's Ethics Guidelines - http://www.comp.utas.edu.au/app/ethics.jsp. Copies of the guidelines are also available in all School labs. The School's facilities may only be used for study-related purposes, and may not be used for personal gain. The playing of games is strictly prohibited in all labs at all times. Before being granted access to the School's facilities, you will be required to sign a declaration that you have read and understand these guidelines, and that you will abide by them. Disciplinary action may be taken against students who violate the guidelines.

Occupational Health and Safety

The university is committed to providing a safe and secure teaching and learning environment. For more information see http://www.admin.utas.edu.au/hr/ohs/pol_proc/

ASSESSMENT

Assessment Items

Item 01

Title: Practical
Type: In-Semester - group project
Weighting: 10%
Due: week 12

Actual due dates will be negotiated in week 1. Assessed work will be a mixture of group work and individual items.

Item 02

Title: Paper 1
Type: In-Semester - individual assignment
Weighting: 10%
Due: week 5

Due dates will be negotiated in week 1 and revisited as semester progresses.

Item 03

Title: Paper 2
Type: In-Semester - individual assignment
Weighting: 10%
Due: Week 9

Due dates will be negotiated in week 1 and revisited as semester progresses.

Item 04

Title: Examination
Type: Formal Examination
Weighting: 70%
Due: University Examination Period

This is a closed book examination

See the 'Assessment' section in unit website for more detailed information about assessment items.

In-Semester Assessment

Unless specifically stated in the specification of the assessment item provided on the unit website, it is required that:

- work submitted by a student is the work of that student alone OR
- where the assessment item is to be completed by a group of students, the work submitted
by the group of students is the work of that group of students alone.

Plagiarism

Plagiarism is a form of cheating. It is taking and using someone else's thoughts, writings or inventions and representing them as your own, for example:

- using an author's words without putting them in quotation marks and citing the source;
- using an author's ideas without proper acknowledgment and citation; or
- copying another student's work.

If you have any doubts about how to refer to the work of others in your assignments, please consult your lecturer or tutor for relevant referencing guidelines, and the academic integrity resources on the web at http://www.utas.edu.au/tl/supporting/academicintegrity/index.html.

The intentional copying of someone else's work as one's own is a serious offence punishable by penalties that may range from a fine or deduction/cancellation of marks and, in the most serious of cases, to exclusion from a unit, a course or the University. Details of penalties that can be imposed are available in the Ordinance of Student Discipline – Part 3 Academic Misconduct, see http://www.utas.edu.au/policy/subject.html#students.

The University reserves the right to submit assignments to plagiarism detection software, and might then retain a copy of the assignment on its database for the purpose of future plagiarism checking.

Referencing

The university document on plagiarism contains information about referencing the work or ideas of others. (See http://www.utas.edu.au/plagiarism/.) The preferred text referencing systems for the School is the Harvard system (also referred to as the author-date system).

Submissions

The details of the submission method (paper, electronic or other) for each assignment will be supplied in a separate assignment specification sheet. All in-semester assignment submissions (including electronic submissions) are to include an Assignment Cover Sheet which includes a statement confirming that the submission is your own work. If this undertaking is not signed, the assignment will not be marked. The Assignment Cover Sheet is available from the School Help Desk in Launceston and Hobart, and on the School's web site http://www.comp.utas.edu.au/app/studyresources.jsp.

Extensions and Penalties

Assessment items will not be accepted after the due date except under the conditions stated in the school policy on late assessment. http://www.comp.utas.edu.au/app/late_assess.jsp

Formal Examination

The formal examination is conducted by the University Registrar. The 'Current Students' section on the university website contains information about the conduct of, and timetable for, formal examinations.

Final Grade

Overall assessment will be based on the student's performance throughout the semester as well as in a formal examination. In order to achieve a pass (or better) result, a student must obtain:

1. at least 40% of the total mark for in-semester assessment items
2. at least 40% of the mark for the formal examination
3. at least 50% of the overall mark

Passing grades will be awarded based on the AVCC guidelines:

- PP at least 50% of the overall mark but less than 60%
- CR at least 60% of the overall mark but less than 70%
- DN at least 70% of the overall mark but less than 80%
- HD at least 80% of the overall mark

The maximum mark awarded to a student who fails the unit will be 44.

For more information, including other grades such as Supplementary and Terminating grades, see the School of Computing's guidelines for assessment - available at: http://www.comp.utas.edu.au/app/assess.jsp