Software Engineering 4C03
Computer Networks and Computer Security
Winter 2006

Course Outline

Revised: 2 January 2006

Note: This course outline contains important information that may affect your grade. You should retain it throughout the semester as you will be assumed to be familiar with the rules specified in this document.

Instructor

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Teaching Assistant

Reza Sherafat (`sherafr@mcmaster.ca`)
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Course Web Site

`http://www.cas.mcmaster.ca/~wmfarmer/SE-4C03-06/`

Schedule

Lectures:	TRF	11:30–12:20	JHE 326H
Lab sessions:	T	14:30–17:20	ITB 238

Calendar Description

"Physical networks, internets, the TCP/IP protocol suite, common network services. Principles of information security, computer and network security threats, defense mechanisms, encryption."

Mission

The Internet has revolutionized science, technology, and culture and has elevated information security to a major societal concern. The mission of the course is to teach students the underlying principles of internetworking and information security. The student will learn how the Internet works and what are its strengths and weaknesses. The course will discuss the threats to the security of computers and networks and the techniques that can be used to counter these threats. The discussion will include physical networks, the TCP/IP protocol suite, common network services, information security measures, and applications of cryptography.

Required Text

D. E. Comer, *Internetworking with TCP/IP, Vol. 1, Fifth Edition*, Prentice Hall, 2005. ISBN: 0131876716.

Work Plan

There will be lectures, five lab exercises, a research project, a midterm test, and a final exam. The lectures will be given by the instructor during regular class sessions.

The lab exercises will be performed by the students during the lab sessions on following Tuesday afternoons: January 24, February 7, 28, March 14, 28. The lab exercises will be performed on an experimental "Little Internet" of virtual computers running Unix. The Little Internet will be configured and secured by the students.

Each student will individually do a research project on some important topic or new technology in networking or security. The project will consist of two parts:

1. A proposal for what topic or technology to investigate.

2. A 2-page paper presenting the topic or technology.

Further details concerning the project will be provided later.

The midterm test will be held on Friday, February 17, 2006 at 11:30–12:20. The final exam will be 2 hours long. It will take place on the date scheduled by the University.

Log Book

Each student is expected to keep a detailed, up-to-date log book that records all the steps performed on the lab exercises and the research project. Sources of information, consultations with instructors and fellow students, successful and failed experiments, discovered errors, and lessons learned should be recorded. The entries in the log book should be listed chronologically with dates and times.

A copy of the student's log book must be included as part of each final lab exercise report, the project proposal, and the project paper.

Academic Dishonesty

Academic dishonesty consists of misrepresentation by deception or by other fraudulent means and can result in serious consequences, e.g., the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: "Grade of F assigned for academic dishonesty"), and/or suspension or expulsion from the university.

It is your responsibility to understand what constitutes academic dishonesty. For information on the various kinds of academic dishonesty please refer to the Academic Integrity Policy, specifically Appendix 3, located at

`http://www.mcmaster.ca/senate/academic/ac_integrity.htm`

The following illustrates only three forms of academic dishonesty:

1. Plagiarism, e.g., the submission of work that is not one's own or for which other credit has been obtained.

2. Improper collaboration in group work.

3. Copying or using unauthorized aids in tests and examinations.

Your work must be your own. Plagiarism and copying will not be tolerated! If it is discovered that you plagiarized or copied, or that you have consulted with people not mentioned in your log book, it will be considered as academic dishonesty.

Students may be asked to defend their written work orally.

Other Policy Statements

1. Significant study and reading outside of class is required.
2. Regular attendance is expected.
3. The student is expected to ask questions during class.
4. You may want to discuss the assignments with your fellow students. *If you do that, you must record a summary of your discussions in your log book including a list of all those with whom you had discussions and a description of what information you received.* It is part of your professional responsibility to give credit to all who have contributed to your work.
5. A student may use his or her texts and notes during the midterm test and final exam.
6. Assignments may not be submitted late and the midterm test may not be taken later without *prior* approval from the instructor.
7. The instructor reserves the right to require a deferred final exam to be oral.
8. Calculators and electronic devices are *not* permitted during the midterm tests and final exam.
9. The Faculty of Engineering is concerned with ensuring an environment that is free of all adverse discrimination. If there is a problem, that cannot be resolved by discussion among the persons concerned, individuals are reminded that they should contact their Department Chair and the Human Rights and Equity Services (HRES) office as soon as possible.
10. Suggestions on how to improve the course and the instructor's teaching methods are always welcomed.

Grading

The course grade will be based on the student's performance on the lab exercises, research project, midterm test, and final exam as follows:

Lab Exercises (5)	20%
Research project (proposal and paper)	20%
Midterm test	20%
Final exam	40%
Total	**100%**

Notes:

1. *A student who fails the final exam automatically fails the course.*
2. The project papers will be formally assessed by the class.
3. The instructor reserves the right to adjust the marks for an assignment, midterm test, or final exam by increasing or decreasing every score by a fixed number of points.

Syllabus

00 Preliminaries

01 Physical Networks [chapter 2]

02 The Internet Model and TCP/IP [chapters 1, 3]

03 Internet Addressing [chapters 4, 5, 9]

04 Internet Protocol (IP) [chapters 6–8]

05 Transport Protocols [chapters 10–12]

06 Information Security [chapter 30 and notes]

07 Overview of Cryptography [notes]

08 Interaction Schemes [chapters 18–21]

09 Common Network Services [chapters 23–27]

10 Defense Mechanisms [chapter 30 and notes]