Computer Science 3CN3
Computer Networks and Security

and

Software Engineering 4C03
Computer Networks and Computer Security

Winter 2008

Course Outline

Revised: 5 March 2008

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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Course Web Site

`http://www.cas.mcmaster.ca/~wmfarmer/SE-4C03-08/`

Some limited services for this course may be offered via WebCT. Go to `http://webCT.mcmaster.ca` to access the course's WebCT page.

Students should be aware that, when they access the electronic components of this course, private information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in this course will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure please discuss this with the course instructor.

Schedule

Lectures:	TWF	12:30–13:20	JHE 326H
SE 4C03 lab session:	R	14:30–17:20	ITB 235
CS 3CN3 lab session:	F	14:30–17:20	ITB 235

CS 3CN3 Calendar Description

"Networked computer systems: physical media, TCP/IP protocols, switching methods; net layering and components: data link, network, transport; application: wireless, ubiquitous; secure systems: protocols, perimeter defenses, access control issues, retrofitting."

SE 4C03 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. By the end of the course the student should:

1. Understand how the Internet works and what are its strengths and weaknesses.
2. Understand the threats to the security of computers and networks and the techniques that can be used to counter these threats.
3. Have a working knowledge of the TCP/IP protocol suite, basic network services, cryptography, and common information security tools.
4. Be able to perform basic networking tasks on computers running Unix-style operating systems.

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 done by the SE 4C03 students during the lab sessions on the following Thursday afternoons: February 7, February 14, March 6, March 27, and April 3. The lab exercises will be done by the CS 3CN3 students during the lab sessions on the following Friday afternoons: February 8, February 15, March 7, March 28, and April 4. The lab exercises will be performed in teams of two or three students on an experimental "Little Internet" of virtual computers running Linux. The Little Internet will be configured and secured by the students.

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

1. A wiki page presentation of the topic.

2. A project report.

The wiki page presentation will be added to the Computing and Software Wiki at

`http://www.cas.mcmaster.ca/wiki/`.

Further details concerning the project will be provided later.

The midterm test will be held on Tuesday, February 26, 2008 during the regular class time at 12:30–13:20. The final exam will be 2 hours long. It will take place on the date scheduled by the University.

The class will pick a *class representative* who will serve as a liaison between the students and the instructor.

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. The log book may be either a physical book (such as a lab or composition book) or an electronic document (such as a text file). *A copy of the student's log book must be included as part of the project report and each final lab exercise report.*

Academic Dishonesty

You are expected to exhibit honesty and use ethical behavior in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity.

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behavior 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 types of academic dishonesty please refer to the Academic Integrity Policy, located at

`http://www.mcmaster.ca/academicintegrity/`

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, 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. Students are required to attend the lectures and tutorials. Attendance will be recorded, and absences will be excused only in highly exceptional cases.
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 test 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.

Marking Scheme

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 (wiki page and project report)	20%
Midterm test	20%
Final exam	40%
Total	**100%**

Notes:

1. A student's final score will be reduced by one half point for each missed lecture (there is no penalty for the first *six* missed classes).

2. The project wiki pages 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]

11 Routing Protocols [chapters 13–15]