Department of Computing

COMP347 Computer Networks

Study Guide

Semester two 2006

Division of Information and Communication Sciences
COMP347 Computer Networks

Course Aims

- This course gives an understanding of advanced topics in the design and implementation of computer networks.
- It provides an in-depth understanding of key protocols of the TCP/IP protocol suite and its relationship to emerging technologies.
- This course will allow students to develop knowledge and expertise in key areas such as intra- and inter-domain routing protocols, multicast protocols, different transport protocols, Quality of Service and multimedia.
- These concepts will be reinforced through tutorials and lab sessions.

Assumed Knowledge

1. Understanding of the OSI and Internet network models for networks. (COMP247)
2. Understanding of key networking and internetworking technologies. (COMP247)
3. Understanding of key networking protocols and components. (COMP247)
4. Understanding of basic physical and layer medium access control concepts, techniques and protocols. (COMP247)
5. Basic level of mathematical sophistication. (any MATH130-136)
6. Good programming skills including experience in C or C++ (ideally C). (COMP225 or COMP229 or INFO 240)

Learning Outcomes

1. A deep understanding of the protocols in the TCP/IP family.
2. Use of Internet Protocols as a vehicle for understanding computer networking concepts.
3. Practical experience programming for the Internet.
4. Understanding of addressing schemes used in the Internet.
5. Understanding of intra-domain and inter-domain routing and multicasting protocols in Internet.
6. Understanding of principles underlying various approaches toward providing transport layer services in the Internet.
7. Understanding of multimedia networking protocols in the Internet, including Quality of Service issues.
8. Understanding of Quality of Service architectural components to support Internet.
9. Understanding of evolving Internet technologies such as mobile and ad hoc networking.
10. Understanding of the relationship between important application layer protocols (eg., DNS, ftp, e-mail, http) and networks.
11. Basic understanding of network security technologies (firewalls, IPSEC, etc)

Generic Skills

Students completing this course will have the opportunity to develop and employ the following generic skills:

- The ability to carry out advanced and broadly based problem-solving [assignments and tutorial exercises]
- The ability to apply creative thinking.
- Self-awareness, knowledge of own abilities, strengths, weaknesses, self-discipline and motivation, independent learning skills [assignments in particular]
- The ability to perform time management for themselves and to meet deadlines [assignments in particular]
- Teamwork and cooperative learning skills [tutorial group activities]
- The ability to read, analyse and understand written material [assignments and assigned readings]
- The ability to research, analyse and synthesise [assignments and tutorial exercises]
- Numerical and quantitative skills [tutorial exercises]
- Information technology skills [assignments]
- Presentation skills -- written [assignments] -- oral [tutorial discussion]
- An awareness of the influence of the disciplines on history and society [tutorial discussion]
Staff
- Len Hamey, E6A327, 9850-9527, email len at ics.mq.edu.au (unit coordinator)
- Rajan Shankaran, E6A337, 9850-9537, email rshankar at ics.mq.edu.au

See unit web site for staff consultation hours.

Course Material
Material relating to the course will be posted on the Web at:

http://online.mq.edu.au/pub/COMP347/

Students are expected to refer to this website regularly. All assignments, tutorials and practical exercises will be distributed via the web site. In addition, notices of interest to all students (such as assignment due dates, and any other information) will be posted on the web site. This may be the only notice that is given to students.

Textbooks
Students are expected to purchase and read the text book:


Students are also expected to read the relevant RFCs which may be found on-line at www.rfc.net.

Students may find the following reference books helpful:
- [KRC] Brian Kernighan and Dennis Ritchie, The C Programming Language, Prentice Hall, 1988. (This is the classic reference book for C, but there are many other books you could use instead.)

Timetable
Lectures
Day students Tues 1pm, Wed 1pm, Thurs 4pm

Tutorials commence in Week 2
time selected at enrolment

Practicals commence in Week 2
time selected at enrolment

See the unit web site for more details.

Workload
COMP347 is a three credit point unit. It is therefore expected that a student will spend approximately 9 hours per week on this unit throughout the semester. Since there are five hours of timetabled classes, this means you can expect to spend at least four hours working on the unit outside of class. Students who encounter difficulty with the material in the unit (including the assignment work) will require additional time. You should note that it is extremely unlikely that the practical and assignment work can be completed solely within your scheduled practical class time – you are expected to complete this work at other times.

You will gain the most from tutorials if you prepare the material in advance – read the tutorial and any associated information (such as rules for the Security Protocol Game) and prepare answers to the tutorial questions.
Practicals will involve the use of IBM compatible PCs and SUN workstations. Equipment resources are very limited and you should only plan on being able to access the machines without difficulty during off-peak times. The lack of availability of machines at peak times will not be accepted as an excuse for late work. Students with access to appropriate machines may be able to do some of their work off-campus. However, all assignments must work correctly when tested on Macquarie University facilities.

**Assessment**
There are 2 components:

<table>
<thead>
<tr>
<th>Assignments</th>
<th>30%</th>
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<tbody>
<tr>
<td>Final Exam</td>
<td>70%</td>
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In order to pass the unit (i.e. obtain a grade of PC or better) you are required to perform satisfactorily in the assignments and also in the final examination.

**Assignments**
There will be three assignments in this unit. Assignments 1 and 2 attract significant marks towards your final result.

In addition, you will be required to research current social implications of the InterNet for tutorial discussion and, like all course material, this research is examinable. Commence this research early as it may take you some time to find the necessary published articles.

Assignment 0 is due in the second week. You must successfully connect to the SFTP server (used for assignment 1) and receive the connection message from the server by the end of week 2. Although this assignment is not worth any marks, it is very important to pass this assignment. In particular, note that it may have impact on your eligibility for special consideration in the final examination.

Deadlines are firm in this unit – see below.

<table>
<thead>
<tr>
<th>Assignment number</th>
<th>Assignment name</th>
<th>Date out</th>
<th>Date due</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Connect to SFTP server</td>
<td>Aug 1</td>
<td>Aug 11</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>SFTP</td>
<td>Aug 1</td>
<td>Oct 3 (code)</td>
<td>15</td>
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<td></td>
<td></td>
<td></td>
<td>Oct 4 (report)</td>
<td></td>
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<tr>
<td>2</td>
<td>Addressing and Mobile IP</td>
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<td>15</td>
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**Submission of Assignments**
Students are warned that deadlines will be firm in this unit. This means that you must plan to finish your assignments early so that when something goes wrong (and it will) you have time left to fix it. As the deadline approaches, there will be insufficient resources for all the students. This will not be accepted as an excuse, as a well managed assignment would have all the programming done leaving only write-up to be completed at this late stage. Since a carefully hand-written presentation is just as good as a typed one, you won't need any computing resources to finish the assignment. Set your personal deadline earlier than the assignment due date. Always keep a back-up copy of your work that could be presented in case of disaster. Take care to ensure that no one else picks up your printouts. Such disasters will not be accepted as an excuse for late work or plagiarism.

Notice that assignments are marked on the basis of what is handed in. This means that the write-up has a significant impact on the overall result. It deserves considerable effort, and should serve to demonstrate your level of understanding of the assignment topic.

If illness or misadventure prevents you completing your assignment on time, you should contact us as soon as possible. We may make special arrangements for you to meet the requirements of the
assignment, or we may consider your situation in marking the assignment. In any case, you should make every effort to submit, before the due date, what you have achieved at that point.

Written reports will be collected at the start of the lecture on the due date. The electronic submission of your program for assignment one will be due before the due date for the report.

Final Examination
A three hour written examination will be held at the end of semester.

Lecture Material
The lecture material will be heavily based upon the text and reference books and the relevant RFCs. Students are expected to have already gained some experience with both Unix and C. Any student lacking such experience will be expected to apply additional effort to gain the necessary proficiency.

See the unit web site for lecture materials, readings and week-by-week topics.

Computer Laboratories
Details of the computing facilities are available at:


The laboratory usage policy is available at:


Special Consideration
The Department's policy applies to this unit:


You must complete all assignments to be eligible for special consideration for the final examination in this unit.

Liaison Committee
There is a Student-Staff Liaison Committee for each unit level, i.e. 100, 200 and 300. Details are available at:


Get involved and have a say about your studies!

Plagiarism
The Department is particularly keen to ensure students are aware of its zero tolerance attitude to plagiarism. See the Department policy:


HELP!
Note that Lisa Chanell is available on Tuesdays and Thursday in E6A312 to help with student problems. Lisa is available from 9:30 to 12noon and 2:00pm to 4:30pm.

All changes to student's timetable classes must be done via the Change of Program sessions held during the first few weeks of semester.

For academic help from individual members of staff, either attend their consultation hours (see the unit web site) or send them an e-mail.

Note: Only email lecturers if you are unable to attend during their consultation hours (you will need a valid reason for your inability to attend e.g. lecture clash, work commitments). A
suitable appointment time can then be agreed. Do not email individual questions to lecturers, use the consultation hours – this is what they are for!