

High Speed Networking PG – 6692

Unit Outline 2009

Faculty of Information Sciences and Engineering

University of Canberra

*Australian Government Higher Education (CRICOS)
Registered Provider number: #00212K*

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This Unit Outline must be read in conjunction with:

- a) *Studying at the University of Canberra: A Guide to Policies and Procedures*, which sets out University-wide policies and procedures, including information on matters such as plagiarism, grade descriptors, moderation, feedback and deferred exams, and is available at <http://www.canberra.edu.au/student-services>
- b) *Guide to Student Services at the University of Canberra*, and is available at <http://www.canberra.edu.au/student-services>
- b) Any additional information specified in section 6f.

1: General Information

- 1a Unit title**
High Speed Networking
- 1b Unit number**
6692
- 1c Semester and year offered**
S1, 2009
- 1d Credit point value**
3CP
- 1e Unit level**
Post Graduate (PG)
- 1f Name of Unit Convener and contact details (including telephone and email)**
Dipl.-Ing. C. Chlap, 6201 2391, Chris.Chlap@canberra.edu.au, Office 11B16
- 1g Name of Unit Moderator and contact details (including telephone and email)**
Dr. Dharmendra Sharma, 6201 2153, Dharmendra.Sharma@canberra.edu.au, Office 11B13.
- 1h Administrative contact details (including name, location, telephone and email)**
The School Office 11B14, Ph: 6201-2417/6201-2153, email: ise@canberra.edu.au

2: Academic Content

2a Unit description and learning outcomes

Unit description: The unit provides an overview of high-speed networking technologies and the software required to achieve high throughput and low latency. Topics covered include networking devices such as bridges, switches and routers; networking technologies such as fibre optic links, Ethernet, ADSL and ATM; network interfaces and network processors; traffic types such as constant bit rate, variable bit rate and real-time traffic; protocol implementation; throughput and performance measurement.

Learning outcomes: On completion of this unit students will be able to design and configure networks that have the performance characteristics needed to support a specified set of applications for a specified number of users.

2b Prerequisites and/or co-requisites

Computer Structures and Networks (G)

3: Delivery of Unit and Timetable

3a Delivery mode

This subject is delivered on campus with weekly lectures and tutorials/labs, as per UC timetable for the semester.

3b Schedule of topics/lectures/tutorials/practicals/field classes by week

Week	Activity
1	High Speed Networking Concepts
2	Overview of protocols (TCP/IP)
3	Socket programming examples for Assignment 1
4	Network performance criteria, application requirements
5	Network Technologies (ATM, Ethernet, DSL, Wireless)
6	Network Devices (Bridges, Switches, Routers)
7	High Speed Networking Application Software
8	<i>class free period</i>
9	<i>class free period</i>
10	Web Servers, Performance Issues, Performance Measurement
11	Web Clients, Performance Issues, Performance Measurement
12	Voice and video over IP (SIP, RTP, RTSP)
13	Assignment 2 discussion
14	Special Topic: Design of a low-cost Embedded Networking Unit.
15	Revision and Examination Topics.

4: Unit Resources

4a Lists of required texts/readings

Required Texts:

You will require one textbook that serves as a reference for TCP/IP Networking. One of the following books is recommended, although none cover all of the material included in this unit.

Computer Networking, 4th Edition,
Kurose and Ross, Addison Wesley 2008.

Internetworking with TCP/IP Volume 1, 5th Edition,
Douglas Comer, Prentice-Hall 2005.

You **must** also download and read this book:

Dutton & Lenhard: High-Speed Networking Technology: An Introductory Survey
IBM Redbooks, 1995. [Download](#)

Supplementary readings:

High-Speed Networking: A Systematic Approach to High-Bandwidth Low-Latency Communication, by James P. G. Sterbenz (Author), Joseph D. Touch (Author).
John Wiley & Sons 2001.

Network System Design using Network Processors (Intel 2xxx Version)
by Douglas Comer, Prentice-Hall 2005.

Online materials:

Lecture materials, tutorial questions and answers, assignment specifications, and other details are available on the subject web site.

4b Materials and equipment

While the computers and software in the Building 11 Student Laboratories **may** be used in this unit, it is strongly recommended that you use your own personal computers (2 required) and the supplied open source software for assignment work. If you own only one PC, then please liaise with other students in order to test your assignment submissions.

4c Unit website

[Moodle](#)

5: Assessment

5a Assessment overview

Assessment Item (including exams held in the exam period)	Due Date of Assignments	Weighting (total to equal 100%)
Assignment 1	5:00pm, Friday of Week 6	20%
Assignment 2	5:00pm, Friday of Week 14	20%
Examination	University examination period	60%

5b Details of each assessment item

Assignment 1: Network Performance Measurement.

Assignment 2: Application Performance Measurement.

Final Examination: Closed book, no materials are permitted.

Full details are available on the unit web site (see 4c).

5c Special assessment requirements

The final assessment in the subject will result in one of the following grades: HD, DI, CR, P or Fail. Please note that PX grades are no longer available at UC.

total_mark = assignment_1_mark (out of 20) + assignment_2_mark (out of 20) + examination_mark (out of 60)

The grade for the subject is then determined according to the following rules:

Total mark (out of 100)	Exam mark (out of 60)	Final Grade
≥ 85	<i>and</i> ≥ 51	HD
≥ 75	<i>and</i> ≥ 45	DI
≥ 65	<i>and</i> ≥ 39	CR
≥ 50	<i>and</i> ≥ 30	P
< 50	<i>or</i> < 30	(NX, NS, NC or NN)

5d Supplementary assessment

There will be no supplementary test or exam.

Students who miss the final exam due to illness must provide a doctor's certificate, stating that the student was not able to sit for the exam, to the lecturer in charge as soon as possible - generally within 3 days of the examination

5e Text-matching software

No text-matching software will be used in this Unit.

6: Student Responsibility

6a Workload

The amount of time you will need to spend on study in this Unit will depend on a number of factors including your prior knowledge, learning skill level and learning style. Nevertheless, in planning your time commitments you should note that for a 3cp Unit the total notional workload over the fifteen-week semester is assumed to be 150 hours or an average of 10 hours per week. These hours include time spent in classes. The total workload for Units of different credit point value should vary proportionally. For example, for a 6cp Unit the total notional workload over a fifteen-week semester is assumed to be 300 hours or an average of 20 hours per week.

6b Special needs

Students who need assistance in undertaking the unit because of disability or other circumstances should inform their Unit Convener or the Disabilities Office as soon as possible so the necessary arrangements can be made.

6c Attendance requirements

Lecture attendance records will be kept. Students who do not attend regularly will almost certainly fail the final exam.

6d Required IT skills

See Section 2b

6e Costs

Textbooks, software and consumables. Information about the DETYA guidelines on student charges for HECS students can be found on OSIS.

6f Additional information

All assignments will require background reading, programming knowledge, keen observation and the development of a factual line of argument to support an adopted stance. It is also a requirement that each assignment is solely the work of the individual submitting it (unless explicitly stated otherwise) and that it is produced specifically for the subject in question. The reproduction, paraphrasing, summarizing or otherwise presenting in altered form, another person's ideas or arguments without acknowledgment is plagiarism. Plagiarism includes submitting work prepared by another author, including another student, as one's own. Any form of plagiarism will be reported to the Head of School for investigation.

7: Student Feedback

All students enrolled in this Unit will have an opportunity to provide anonymous feedback on the Unit at the end of the Semester via the Unit Satisfaction Survey which will be presented to you on OSIS. Your lecturer or tutor may also invite you to provide more detailed feedback through an anonymous questionnaire administered through the University's Centre for the Enhancement of Learning Teaching and Scholarship (CELTS).

8: Authority of this Unit Outline
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Any change to the information contained in Section 2 (Academic content), Section 3 (Delivery of Unit and timetable) and Section 5 (Assessment) of this document, will only be made by the Unit Convener if the written agreement of staff and a majority of students has been obtained; and if written advice of the change is then forwarded to each student enrolled in the Unit at their registered term address. Any individual student who believes him/herself to be disadvantaged by a change is encouraged to discuss the matter with the Unit Convener.