



The University of Southern Queensland

Course specification

Description: Computer Communication and Internetworking						
Subject	Cat-nbr	Class	Term	Mode	Units	Campus
CSC	3407	58136	3, 2006	EXT	1.00	Toowoomba

Academic group:	FOSCI
Academic org:	FOS003
Student contribution band:	2
ASCED code:	020113

STAFFING

Examiner: Ian Richards
Moderator: Jamie Shield

REQUISITES

Pre-requisite: CSC2401 or USQIT16

OTHER-REQUISITES

Recommended Pre-requisite: CSC2402 and CSC2405 and CSC2408

RATIONALE

Explosive growth in computer networks in the last two decades has changed the uses of computers dramatically. The largest computer network, Internet, is now connecting millions of computers in the world, providing services like email, file transfer, hypermedia information retrieval across all kinds of different platforms. This course is the introductory course in computer networking. It concentrates on basic concepts and protocols of computer networks. It uses TCP/IP based Internet as a case study to reveal and address the general principles of network design. This course serves as a foundation for two further courses in computer networking, namely Network Design and Analysis (CSC3413) and Computer Network Programming (CSC4402).

SYNOPSIS

This course addresses the layered structure of computer communication networks. It focuses on the most widely used TCP/IP protocol suite and uses TCP/IP protocols to teach the general principle of computer communication network design. After this course, the students will have not only general knowledge about computer networks but also the understanding and practical skills of managing TCP/IP Internetworking. The topics include: Internetworking Concepts and Architecture, Data Link Layer, Internet Address, ARP and RARP, Internet Protocols, User Datagram Protocol (UDP), Reliable Stream Transport (TCP), Routing, Transparent Gateways and Subnetting, Domain Name System (DNS), Wireless Networks, Application Programming Interfaces (API), Internet Applications, ISO Standards, Future Direction in Networking. This course is not offered at Wide Bay in odd years

OBJECTIVES

On successful completion of this course students will be able to:

1. define terminology commonly used in computer networking; (All assessments)
2. describe and compare the Internet and OSI network reference models; (All assessments)
3. contrast the use of connection-oriented and connectionless network services and protocols; (All assessments)
4. explain the operation of and describe the implementation of the principal Internet protocols (IP, TCP, UDP); (All assessments)
5. illustrate the principles of IP addressing by preparing address allocation schemes or routing tables; (All assessments)
6. employ Linux commands to analyse the operation of TCP/IP networks; (Assignment 1)
7. explain the operation of IP addressing including the ARP, OSPF and BGP protocols; (All assessments)
8. develop simple client-server applications using the socket programming interface; (Assignment 2)
9. describe the features and operation of the Domain Name System; (All assessments)
10. explain the operation of email systems including the SMTP and POP protocols; (All assessments)
11. identify the principal physical communication media and their characteristics; (All assessments)
12. explain the purpose of the data link layer and describe techniques for framing, error and flow control; (All assessments)
13. describe the characteristics and operation of Ethernet LANs and Wireless LANs; (All assessments)
14. contrast the purpose and operation of switches, bridges, repeaters and routers; and (All assessments)
15. identify the main security issues for networks and appropriate techniques to address them. (All assessments)

TOPICS

	Description	Weighting (%)
1.	Communication Protocols and Architectural Concepts	10.00
2.	Physical Communication Media and Techniques	5.00
3.	Data Link Protocols	5.00
4.	Local Area Networks	10.00
5.	Network Layer Protocols, including IP and subnetting	10.00
6.	Internet Routing Protocols	10.00
7.	Transport Protocols including TCP	10.00
8.	TCP Implementation Issues	10.00
9.	Network Programming and the Socket Interface	10.00
10.	Internet Applications	10.00
11.	Network Security	10.00

TEXT and MATERIALS required to be PURCHASED or ACCESSED

ALL textbooks and materials are available for purchase from USQ BOOKSHOP (unless otherwise stated). Orders may be placed via secure internet, free fax 1800642453, phone 07 46312742 (within Australia), or mail. Overseas students should fax +61 7 46311743, or phone +61 7 46312742. For costs, further details, and internet ordering, use the 'Textbook Search' facility at <http://bookshop.usq.edu.au> click 'Semester', then enter your 'Course Code' (no spaces).

Department of Mathematics and Computing DVDROM SET, 2006 (available from the USQ Bookshop). This DVD set contains course material, Windows and Linux Software relevant to this course offering. For more information about the DVD sets and their use, please refer to <http://www.sci.usq.edu.au/dvdrom> and the course web site. The purchase of this DVDROM set is recommended if the student has not done so already.

Tanenbaum, AS 2002, *Computer networks*, 4th edn, Pearson Educational International, Upper Saddle River, NJ.

REFERENCE MATERIALS

Reference materials are materials that, if accessed by students, may improve their knowledge and understanding of the material in the course and enrich their learning experience.

Comer, DE 2004, *Computer networks and internets: with internet applications*, 4th edn, Pearson Prentice Hall, Upper Saddle River, NJ.

Comer, DE 2001, *Internetworking with TCP/IP: principles, protocols and architecture*, 4th edn, Prentice Hall, Upper Saddle River, NJ, Vol 1.

Comer, DE & Stevens, DL 2001, *Internetworking with TCP/IP: client-server programming and applications*, Prentice Hall, Upper Saddle River, NJ, Vol 3.

(Linux/Posix Socket Version)

Hunt, C 2002, *TCP/IP network administration*, 3rd edn, O'Reilly & Associates, Sebastopol, CA.

Kurose, JF & Ross, KW 2003, *Computer networking: a top-down approach featuring the internet*, 2nd edn, Addison Wesley, Boston.

Perlman, R 2000, *Interconnections: bridges, routers, switches and internetworking protocols*, 2nd edn, Addison Wesley, Reading, MA.

Stallings, W 2004, *Data and computer communications*, 7th edn, Pearson/Prentice Hall, Upper Saddle River, NJ.

Stallings, W 2002, *Network security essentials: applications and standards*, 2nd edn, Pearson Education, Upper Saddle River, NJ.

Stevens, W Richard 1994, *TCP/IP Illustrated: the protocols*, Addison Wesley, Vol 1.

Stevens, W Richard 2004, *UNIX Network Programming: the sockets networking API*, 3rd edn, Addison Wesley, Boston, Vol 1.

STUDENT WORKLOAD REQUIREMENTS

ACTIVITY	HOURS
Directed Study	65.00
Examinations	3.00
Private Study	107.00

ASSESSMENT DETAILS

Description	Marks out of	Wtg(%)	Due date
ASSIGNMENT 1	100.00	25.00	22 Dec 2006 (see note 1)
ASSIGNMENT 2	100.00	25.00	28 Jan 2007
3 HOUR CLOSED EXAMINATION	100.00	50.00	END S3 (see note 2)

NOTES

1. When submitted electronically, assignments are due 11:59:59pm Australian Eastern Standard Time on each due date.
2. Examination dates will be available during the semester. Please refer to the examination timetable when published.

IMPORTANT ASSESSMENT INFORMATION

- 1 Attendance requirements:
There are no attendance requirements for this course. However, it is the students' responsibility to study all material provided to them or required to be accessed by them to maximise their chance of meeting the objectives of the course and to be informed of course-related activities and administration.
- 2 Requirements for students to complete each assessment item satisfactorily:
To complete each of the assessment items satisfactorily, students must obtain at least 50% of the marks available for each assessment item. Depending on the requirements of note 4 below, students may not have to satisfactorily complete each assessment item to receive a passing grade in this course.
- 3 Penalties for late submission of required work:
If students submit assignments after the due date without prior approval then a penalty of 10% of the total marks gained by the student for the assignment will apply for each working day late
- 4 Requirements for student to be awarded a passing grade in the course:
To be assured of a passing grade, students must achieve at least 50% of the total weighted marks allocated for the assignments and achieve at least 50% in the examination. (equivalent to option (d))
- 5 Method used to combine assessment results to attain final grade:
The final grades for students will be assigned on the basis of the aggregate of the weighted marks obtained for each of the summative assessment items in the course.
- 6 Examination information:
Candidates are allowed to bring only writing and drawing instruments into the examination.

- 7 Examination period when Deferred/Supplementary examinations will be held:
Any Deferred or Supplementary examinations for this course will be held during the examination period at the end of the semester of the next offering of this course.
- 8 University Regulations:
Students should read USQ Regulations 5.1 Definitions, 5.6. Assessment, and 5.10 Academic Misconduct for further information and to avoid actions which might contravene University Regulations. These regulations can be found at the URL <http://www.usq.edu.au/corporateservices/calendar/part5.htm> or in the current USQ Handbook.

ASSESSMENT NOTES

- 9 The due date for an assignment is the date by which a student must despatch the assignment to the USQ. The onus is on the student to provide proof of the despatch date, if requested by the Examiner.
- 10 In accordance with University policy, the Examiner may grant an extension of the due date of an assignment in extenuating circumstances
- 11 The Faculty will NOT accept submission of assignments by facsimile.
- 12 In the event that a due date for an assignment falls on a local public holiday in their areas, such as a Show holiday, the due date for the assignment will be the next day. Students are to note on the assignment cover the date of the public holiday for the Examiner's convenience.
- 13 Students who have undertaken all of the required assessments in a course but who have failed to meet some of the specified objectives of a course within the normally prescribed time may be awarded the temporary grade: IM (Incomplete - Make up). An IM grade will only be awarded when, in the opinion of the examiner, a student will be able to achieve the remaining objectives of the course after a period of non directed personal study.
- 14 Students may be required to provide a copy of assignments submitted for assessment purposes. Such copies should be despatched to the USQ within 24 hours of receipt of a request to do so.

OTHER REQUIREMENTS

- 1 Students will need to access USQ network servers as they will need to use network diagnostic tools to examine and watch what happens on a network.
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