Description: Computer Communication and Internetworking

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<th>Subject</th>
<th>Cat-nbr</th>
<th>Class</th>
<th>Term</th>
<th>Mode</th>
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<td>CSC</td>
<td>3407</td>
<td>40357</td>
<td>1, 2005</td>
<td>EXT</td>
<td>1.00</td>
<td>Toowoomba</td>
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Academic group: FOSCI
Academic org: FOS003
Student contribution band: 2
ASCED code: 020113

STAFFING
Examiner: Yan Li
Moderator: Ron Addie

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 (CSC8415).

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

TOPICS

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

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 463111743, 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 CDROM SET 1, 2005 (available from the USQ Bookshop). This CD set contains course material, Windows and Linux Software relevant to this course offering. For more information about the CD sets and their use, please refer to http://www.sci.usq.edu.au/cdrom and the course web site. The purchase of this CDROM set is recommended if the student has not done so already.

Tanenbaum, Andrew S 2003, Computer Networks, 4th edn, Prentice Hall,

**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, Douglas, E 2004, Computer Networks and Internets, 4th edn, Pearson Prentice Hall,
(Linux/Posix Socket Version)
Hunt, Craig 2002, TCP/IP Network Administration, 3rd edn, O'Reilly Networking,
Kurose, James, F & Ross, Keith, W 2002, Computer Networks - A Top-Down Approach Featuring the Internet, 2nd edn, Addison Wesley,
Perlman, Radia 2000, Interconnections: Bridges, Routers, Switches and Internetworking Protocols, 2nd edn, Addison Wesley,
Stallings, William 2004, Data and Computer Communications, 7th edn, Prentice Hall,

**STUDENT WORKLOAD REQUIREMENTS**

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>HOURS</th>
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<tr>
<td>Directed Study</td>
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<tr>
<td>Examinations</td>
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<td>Private Study</td>
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ASSESSMENT DETAILS

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<tr>
<th>Description</th>
<th>Marks out of</th>
<th>Wtg(%)</th>
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<tr>
<td>ASSIGNMENT 1</td>
<td>20.00</td>
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<td>ASSIGNMENT 2</td>
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<td>16 May 2005</td>
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NOTES
1. 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.

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 demonstrate, via the summative assessment items, that they have achieved the required minimum standards in relation to the objectives of the course by obtaining at least 50% of the total weighted marks available for the examination and each assignment.

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:
   In a Closed Examination, 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.

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.

2 Students who obtain an overall passing mark, but who do not gain at least 50% of the marks available for the examination, may, at the discretion of the examiner, be granted a supplementary examination.

3 Students will be granted a deferred examination only if they perform satisfactorily in all other assessment items.

4 Plagiarism of other students' work is unacceptable. Any breach will be dealt with in accordance with Faculty and USQ policies.