



MONASH University
Information Technology

FIT3130
Computer network design and deployment

Unit Guide

Semester 2, 2010

The information contained in this unit guide is correct at time of publication. The University has the right to change any of the elements contained in this document at any time.

Last updated: 16 Jul 2010

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Caulfield

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Contact hours: 2:00 to 4:00 pm, Wednesday

South Africa

Dr Das Arran

Contact hours: 0830 am to 1030 am, Tuesday

Malaysia

Mr Thomas O'Daniel

Contact hours: 0900am-1100am, Tuesday

Additional communication information:

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Dr Suttisak Janpavongso (Caulfield); Dr Thomas O'Daniel (Malaysia); Dr Mohan Das (South Africa)

Introduction

Welcome to FIT3130 Computer Network Design and Deployment. Please note lecture times (specified in local times) as below:

Caulfield Campus: Wednesday (14:00-1600 hr@CA_A/A205)

Malaysia Campus: Tuesday (0900-11:00 hr @ MA_Tutorial_9301)

South Africa Campus: Tuesday (0830-1030 hr @SA_LC/SemRoom_7)

Unit synopsis

This unit aims to introduce the systematic top-down network design approach for designing enterprise computer networks. A top down process focuses on requirements analysis and architecture design, which should be completed before the selection of specific network components. The unit provides students with tested processes and tools to help them understand traffic flow, communication protocol behaviour, and internetworking technologies. On completion of the unit, students are equipped to design enterprise computer networks that meet an enterprise users requirements for functionality, capacity, performance, availability, scalability, affordability, security, and manageability.

Learning outcomes

At the completion of this unit students should have:

- a detailed knowledge and understanding of all major protocols used in LAN & WAN and WLAN;
- an understanding of major issues in implementing these protocols;
- a detailed knowledge and understanding of network architectures including interaction with firewalls;
- an awareness of the latest developments in TCP/IP (e.g. IPv6, IPSec, multicasting, VoIP, QoS, iSCSI);
- the knowledge and skills to implement and manage TCP/IP services within wired and wireless LANs;
- understand various measures of data network performance;
- exposition of network performance evaluation tool, Network packet analysers, and other performance measurement tools;
- use simulation packages to construct models of computer networks;
- use models for performance analysis and prediction;
- make recommendations for network performance improvement;
- practical skills in setting up TCP/IP connections and routing configurations for different environments;
- experience in setting up LANs and WANs, and wireless LANs using standard protocols.

Contact hours

2 hrs lectures/wk, 2 hrs laboratories/wk

Workload

- Lectures: 2 hours per week
- Practical classes/Tutorials : 2 hours per week
- Private study (revision, homework and practical class preparation): 8 hours per week

Unit relationships

Prerequisites

One of FIT1005, FIT2008, BUS2062, CPE1007, CSE2004, CSE2318, CSE3318 or GCO3812

Co-requisites

FIT2019 or FIT2020

Prohibitions

CSE3821, CPE3004, CSE5807, FIT3030, FIT3024

Teaching and learning method

Teaching approach

Two hours lecture per week; Two hours tutorial/practical class per week

Timetable information

For information on timetabling for on-campus classes please refer to MUTTS,
<http://mutts.monash.edu.au/MUTTS/>

Tutorial allocation

On-campus students should register for tutorials/laboratories using the Allocate+ system:
<http://allocate.its.monash.edu.au/>

Unit Schedule

Week	Date*	Topic	References/Readings	Key dates
1	19/07/10	Introduction of unit, Part I Identifying network users' needs and goals: Analysing business goals and constraints; analysing technical goals and tradeoffs	Chapters 1 & 2 of Priscilla Oppenheimer (2nd/3rd edition)	
2	26/07/10	Characterising the existing internet network; characterising network traffic	Chapters 3 & 4 of Priscilla Oppenheimer (2nd/3rd edition)	
3	02/08/10	Part II - Logical Network Design: designing a network topology	Chapter 5 of Priscilla Oppenheimer (2nd/3rd edition)	
4	09/08/10	Designing models for Addressing and Naming	Chapter 6 of Priscilla Oppenheimer (2nd/3rd edition)	
5	16/08/10	Selecting Switching and Routing Protocols	Chapter 7 of Priscilla Oppenheimer (2nd/3rd edition)	
6	23/08/10	Developing Network Security Strategies	Chapter 8 of Priscilla Oppenheimer (2nd/3rd edition)	
7	30/08/10	Developing Network Management Strategies	Chapter 9 of Priscilla Oppenheimer (2nd/3rd edition)	
8	06/09/10	Part III Physical Network Design: Selecting Technologies and Devices for Campus Networks	Chapter 10 of Priscilla Oppenheimer (2nd/3rd edition)	
9	13/09/10	Selecting Technologies and Devices for Enterprise Networks	Chapter 11 of Priscilla Oppenheimer (2nd/3rd edition)	
10	20/09/10			

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		Part IV Testing, Optimizing, and Documenting Network Design: Testing the network design	Chapter 12 of Priscilla Oppenheimer (2nd/3rd edition)	
Mid semester break				
11	04/10/10	Optimizing your network design	Chapter 13 of Priscilla Oppenheimer (2nd/3rd edition)	Assignment 1 due - 4:00 pm Wednesday, 6 October 2010
12	11/10/10	Documenting the network design	Chapter 14 of Priscilla Oppenheimer (2nd/3rd edition)	
13	18/10/10	Unit Revision and strategy for Examination	Revision of all chapters	

*Please note that these dates may only apply to Australian campuses of Monash University. Off-shore students need to check the dates with their unit leader.

Unit Resources

Prescribed text(s) and readings

Required Textbook:

Priscilla Oppenheimer, "Top-down Network Design", 2nd/3rd edition, CISCO press, 2004, ISBN: 1-58705-152-4

Recommended Reading:

- Peter Rybaczyk, "Cisco Network Design Solutions for Small Medium Business", 2005, CISCOPress, ISBN: 1-58705-143-5
- Stallings, W, " Computer Networking with Internet protocols and Technology", Pearson, 2004
- Comer, D & Stevens, D, Internetworking with TCP/IP Volume 1, Principles, Protocols, and Architectures, (4rd edition), Prentice-Hall, 2000.
- Comer, D & Stevens, D, Internetworking with TCP/IP Volume 2, Design, Implementation, and Internals, (3rd edition), Prentice-Hall, 1999.
- Held G. Enhancing LAN Performance, (4th Edition) Auerbach-CRC Press 1999. Lloyd-Evans R. Wide Area Network Performance and Optimization Addison-Wesley 1996.
- Jain R. The Art of Computer Systems Performance Analysis Wiley 1991.
- Halsall, F, Data Communications, Computer Networks and Open Systems, Addison-Wesley, (4th edition), Addition Wesley 1996.
- Halsall, F, Computer Networks and the Internet: with internet and multimedia applications, Addison-Wesley, (4th edition), Addition Wesley 2005.
- Schiller, J, Mobile Communications, Addison-Wesley, 2000.
- Williams Stalling Wireless Communications and Networking, ISBN: 0131863169, 2nd Ed, Prentice Hall, 2002.

Text books are available from the Monash University Book Shops. Availability from other suppliers cannot be assured. The Bookshop orders texts in specifically for this unit. You are advised to purchase your text book early.

Recommended text(s) and readings

As given at above

Required software and/or hardware

- 1) Microsoft VISIO 2007 or 2003 version software (a copy can be obtain from ITS); or
- 2) Network design tools; or
- 3) MATLAB Network and optimisation tool boxes latest version

Equipment and consumables required or provided

Students studying off-campus are required to have the minimum system configuration specified by the Faculty as a condition of accepting admission, and regular Internet access. On-campus students, and those studying at supported study locations may use the facilities available in the computing labs. Information about computer use for students is available from the ITS Student Resource Guide in the Monash University Handbook. You will need to allocate up to 4 hours per week for use of a computer,

including time for newsgroups/discussion groups.

Study resources

Study resources we will provide for your study are:

Weekly detailed lecture notes outlining the learning objectives, discussion of the content, required readings and exercises; Weekly tutorial or laboratory tasks and exercises with sample solutions provided one to two weeks later; Assignment specifications; A sample examination; This Unit Guide outlining the administrative information for the unit; The unit web site on Moodle, where resources outlined above will be made available.

Assessment

Overview

Examination (2 hours): 60%; In-semester assessment: 40%

Faculty assessment policy

To pass a unit which includes an examination as part of the assessment a student must obtain:

- 40% or more in the unit's examination, and
- 40% or more in the unit's total non-examination assessment, and
- an overall unit mark of 50% or more.

If a student does not achieve 40% or more in the unit examination or the unit non-examination total assessment, and the total mark for the unit is greater than 50% then a mark of no greater than 49-N will be recorded for the unit.

Faculty late submission penalty clause applies for late submission.

Assignment tasks

Assignment coversheets

Assignment coversheets are available via "Student Forms" on the Faculty website:

<http://www.infotech.monash.edu.au/resources/student/forms/>

You MUST submit a completed coversheet with all assignments, ensuring that the plagiarism declaration section is signed.

Assignment submission and return procedures, and assessment criteria will be specified with each assignment.

Assignment submission and preparation requirements will be detailed in each assignment specification. Submission must be made by the due date otherwise penalties will be enforced. You must negotiate any extensions formally with your campus unit leader via the in-semester special consideration process:

<http://www.infotech.monash.edu.au/resources/student/equity/special-consideration.html>.

• Assignment task 1

Title:

Computer Network Design and Deployment Group Assignment Report and Presentation

Description:

Students are to write a multisite campus network specifications (business requirements and technical goals); carry out logical network design Topology and choice of routing protocols. etc), selection of technologies and devices for physical design, use the simulation package to test some input traffic, observe the network performance and optimise the parts of networks to improve performance.

Weighting:

40%

Criteria for assessment:

Individual will be assessed during the practical class participation and his/her contribution to group based project with respect to:

formal group report and presentation: (weights are as below:)

- concise report and discussion of design specifications (10%)
- evaluation criteria of network design parameters (10%)
- selection criteria of technologies and devices (10%)
- design documentation (5%)
- Conclusion and limitation (5%)

Using the above weightage, the group report will be assessed based on the following criteria:

1. All programs must compile and run correctly. Evidence of testing is required.
2. C++ or Matlab code (if used) should be readable and maintainable and concisely documented.
3. All design algorithms used should follow the style presented in lectures and be correct.
4. Protocol Programming codes should be able to create objects and all methods of that object tested.
5. Completeness - that you have answered all parts of each question (logical and physical network design).
6. Presentation - that you have presented your network designs in a suitably formatted report style and topological style.
7. Test and fine tune your final network design with simulated traffic patterns to meet business and technical design requirements.

Due date:

4:00 pm Wednesday 6 October 2009 4pm

Remarks:

Examination

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Weighting:

60 %

Length:

2 hours

Type (open/closed book):

Closed book

Electronic devices allowed in the exam:

None

See Appendix for End of semester special consideration / deferred exams process.

Due dates and extensions

Please make every effort to submit work by the due dates. It is your responsibility to structure your study program around assignment deadlines, family, work and other commitments. Factors such as normal work pressures, vacations, etc. are not regarded as appropriate reasons for granting extensions. Students are advised to NOT assume that granting of an extension is a matter of course.

Students requesting an extension for any assessment during semester (eg. Assignments, tests or presentations) are required to submit a Special Consideration application form (in-semester exam/assessment task), along with original copies of supporting documentation, directly to their lecturer within two working days before the assessment submission deadline. Lecturers will provide specific outcomes directly to students via email within 2 working days. The lecturer reserves the right to refuse late applications.

A copy of the email or other written communication of an extension must be attached to the assignment submission.

Refer to the Faculty Special consideration webpage or further details and to access application forms: <http://www.infotech.monash.edu.au/resources/student/equity/special-consideration.html>

Late assignment

Assignments received after the due date will be subject to a penalty of **5% per day penalty for late submission, the deadline for late assignment acceptance is before 4:00 pm on Wednesday 6 October 2010. Assignments received later than 4:00 pm Wednesday 6 October 2010 will not normally be accepted.**

Return dates

Students can expect assignments to be returned within two weeks of the submission date or after receipt, whichever is later.

Feedback

Types of feedback you can expect to receive in this unit are:

Informal feedback on progress in labs/tutes

Graded assignments with comments

Interviews

Quiz results

Appendix

Please visit the following URL: <http://www.infotech.monash.edu.au/units/appendix.html> for further information about:

- Continuous improvement
- Unit evaluations
- Communication, participation and feedback
- Library access
- Monash University Studies Online (MUSO)
- Plagiarism, cheating and collusion
- Register of counselling about plagiarism
- Non-discriminatory language
- Students with disability
- End of semester special consideration / deferred exams