



MONASH University

**FIT3130**  
**Computer network design and deployment**

**Unit Guide**

**Semester 2, 2009**

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 : 19 Jul 2009*

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# **FIT3130 Computer network design and deployment - Semester 2, 2009**

## **Chief Examiner:**

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## **Lecturer(s) / Leader(s):**

### **Caulfield**

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Contact hours: Tuesday 2 to 4 pm

### **South Africa**

**Mohan Das**

### **Malaysia**

**Mr Thomas O'Daniel**

## **Additional communication information:**

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

## Introduction

Welcome to FIT3130 Computer Network Design and Deployment for Semester 2, 2009.

## Unit synopsis

The aim of this unit is to provide students with an opportunity to understand network modelling and performance evaluation, queuing theory, indicators of network performance, measuring network performance, and predicting network performance with what-if scenarios, layered structure of networks, technical and implementation details of major protocols in the TCP/IP protocols suite. The unit will review the structure of TCP/IP and the network interface layer, followed by a detailed exposition of the design principles and implementation aspects of protocols in the IP and TCP layers. Routing algorithms routing protocol (RIP, BGP, OSPF, IP, hierarchical etc) and IP network multicasting, congestion control and quality of services (TCP, leak buckets, RSVP) are discussed. This unit will also examine the major application protocols in the TCP/IP protocols suite (e.g. DNS, DHCP, SMTP, NNTP, etc). In addition, the wireless LAN technologies and protocols, 802.11x, are introduced with the aim of supporting mobile applications. The principles and methodologies for the design and deployment of intranets and extranets are also covered.

## Learning outcomes

At the completion of this unit students should have:

1. a detailed knowledge and understanding of all major protocols used in LAN & WAN and WLAN;
2. an understanding of major issues in implementing these protocols;
3. a detailed knowledge and understanding of network architectures including interaction with firewalls;
4. an awareness of the latest developments in TCP/IP (e.g. IPv6, IPSec, multicasting, VoIP, QoS, iSCSI);
5. the knowledge and skills to implement and manage TCP/IP services within wired and wireless LANs;
6. an understanding of the various measures of data network performance;

exposition of network performance evaluation tool, network packet analysers, and other performance measurement tools;

At the completion of this unit students should be able to:

7. use simulation packages to construct models of computer networks;
8. use models for performance analysis and prediction;
9. make recommendations for network performance improvement.

Students will gain practical skills in setting up TCP/IP connections and routing configurations for different environments. They will also gain experience in setting up LANs and WANs, and wireless LANs using standard protocols.

## Contact hours

4 x contact hrs/week

## 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

FIT1005 or FIT2008 or BUS2062 or CPE1007 or CSE2004 or CSE2318 or CSE3318 or GCO3812

### Prohibitions

CSE3821, CPE3004, CSE5807, FIT3030, FIT3024

## Relationships

FIT3130 is a core unit in the [Netric Computing major of the BITS].

Before attempting this unit you must have satisfactorily completed one of the following seven units:

FIT1005 Networking and Data Communications or BUS2062 or CSE2004 or CSE2318 or CSE3318 or GCO3812 or CPE1007

, or equivalent..

You may not study this unit and

CSE3821, CPE3004, CSE5807, FIT3030, FIT3024

in your degree.

## Teaching and learning method

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.cc.monash.edu.au/>

## Unit Schedule

Week	Topic	References/Readings	Key dates
1	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 edition)	20 July 2009
2	Characterising the existing internetwork; characterising network traffic	Chapters 3 & 4 of Priscilla Oppenheimer (2nd edition)	27 July 2009
3	Part II - Logical Network Design: designing a network topology	Chapter 5 of Priscilla Oppenheimer (2nd edition)	3 August 2009
4	Designing models for Addressing and Naming	Chapter 6 of Priscilla Oppenheimer (2nd edition)	10 August 2009
5	Selecting Switching and Routing Protocols	Chapter 7 of Priscilla Oppenheimer (2nd edition)	17 August 2009
6	Developing Network Security Strategies	Chapter 8 of Priscilla Oppenheimer (2nd edition)	24 August 2009
7	Developing Network Management Strategies	Chapter 9 of Priscilla Oppenheimer (2nd edition)	31 August 2009
8	Part III Physical Network Design: Selecting Technologies and Devices for Campus Networks	Chapter 10 of Priscilla Oppenheimer (2nd edition)	7 September 2009
9	Selecting Technologies and Devices for Enterprise Networks	Chapter 11 of Priscilla Oppenheimer (2nd edition)	14 September 2009
10	Part IV Testing, Optimizing, and Documenting Network Design: Testing the network design	Chapter 12 of Priscilla Oppenheimer (2nd edition)	21 September 2009
Mid semester break			
11	Optimizing your network design	Chapter 13 of Priscilla Oppenheimer (2nd edition)	5 October 2009
12	Documenting the network design	Chapter 14 of Priscilla Oppenheimer (2nd edition)	12 October 2009
13	Unit Revision and strategy for Examination	Revision of all chapters	19 October 2009

## Unit Resources

### Prescribed text(s) and readings

#### Required Textbook:

Priscilla Oppenheimer, "Top-down Network Design", 2nd 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

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unit; The unit web site on Moodle, where resources outlined above will be made available.



## Assessment

### Overview

Examination: 60%; Assignments: 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 44% then a mark of no greater than 44-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 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%

**Due date:**

Monday 5 October 2009 4pm

**Remarks:**

**Criteria for assessment :**

formal group report and presentation:

- concise report and discussion of design specifications (10%)

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

## Examination

- **Weighting:** 60 %  
**Length:** 2 hours  
**Type (open/closed book):** Closed book

**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 Monday 5 October 2009. Assignments received later than 4:00 pm Monday 5 October 2009 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.

## 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