MONASH University

ECE4044

Telecommunication Protocols

Unit Guide – on campus

Semester one, 2010

Faculty of Engineering

ECE4044 Telecommunication Protocols

Unit Guide – Clayton campus, on campus mode

Semester one, 2010

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Contents

Unit Outline

Welcome to ECE4044 Telecommunications Protocols. This is a 6 credit point elective unit.

Unit synopsis

This unit aims to study the fundamentals of telecommunication network protocols by having the Internet's software architecture as its primary focus. Reliable communication over an unreliable network layer, connection establishment and teardown, congestion and flow control, and multiplexing issues are covered. The functions of routers and routing algorithms and protocols for finding paths and interconnecting large number of heterogeneous networks are studied. Local area networks and protocols for sharing a multi-access channel are studied. Finally, protocols for network security, techniques for providing confidentiality, authentication, non-repudiation and message integrity are also studied.

Learning outcomes

At the conclusion of the unit, students/you (optional) will be able to:

1. Understand the basic infrastructure and hardware architecture of the Internet
2. Understand the software architecture of the Internet and main protocols
3. Understand the protocols used in contemporary Internet applications, and their purpose
4. Understand the techniques and protocols for provision of security, authentication, non-repudiation and message integrity
5. Gain knowledge on the available networking tools to query parts of the Internet infrastructure including name servers, routers, individual hosts, and websites.
6. Gain knowledge on comparative analysis of various networking protocols and their application
7. Learn to write client and server applications using the Internet protocols

Engineers Australia generic attributes

The Engineers Australia Policy on Accreditation of Professional Engineering Programs – requires that all programs ensure that their engineering graduates develop to a substantial degree the generic attributes listed below. Listed below are the activities in this unit that will help you to achieve these attributes.

Note: that not all graduate attributes are relevant to each unit.

Generic Attribute	Activities used in this Unit to Develop Generic Attributes
a) ability to apply knowledge of basic science and engineering fundamentals;	Laboratory activities, assignments and practical exercises test the students' knowledge and understanding
b) ability to communicate effectively, not only with engineers but also with the community at large;	Laboratory sessions expand the students' written and verbal communication skills
c) in-depth technical competence in at least one engineering discipline;	Mathematical and protocol concepts taught in this subject improve the students' competence and in-depth understanding of the operational principles of modern computer networks
d) ability to undertake problem identification, formulation and solution;	Solved problems at home and tutorial sessions
e) ability to utilise a systems approach to design and operational performance;	Discussions of problems and identification, analysis and resolution processes used in the classes
f) ability to function effectively as an individual and in multi-disciplinary and multi-cultural teams, with the capacity to be a leader or manager as well as an effective team member;	Group activities in laboratory sessions
g) understanding of the social, cultural, global and environmental responsibilities of the professional engineer, and the need for sustainable development;	Included as part of the general class discussions
h) understanding of the principles of sustainable design and development;	Included as part of the general class discussions
i) understanding of professional and ethical responsibilities and commitment to them; and	Included as part of the general class discussions
j) expectation of the need to undertake lifelong learning, and capacity to do so.	Emphasised as necessitated by the rapidly changing technology

Workload

Lectures	2 hours
Computer laboratory	N/A
Laboratory	2 hours
Practice class	1 hours
Tutorial	N/A

Private study	7 hours (consisting of individual and group assignment work, lecture revision, and additional researching and reading)
Total per week	12 hours

Unit relationships

Prerequisites	ECE2041
Corequisites	N/A
Prohibitions	ECE4411, ECE5044, ECE5411, TEC3742

Continuous improvement

Monash is committed to 'Excellence in education' and strives for the highest possible quality in teaching and learning. To monitor how successful we are in providing quality teaching and learning Monash regularly seeks feedback from students, employers and staff. One of the key formal ways students have to provide feedback is through Unit Evaluation Surveys. It is Monash policy for every unit offered to be evaluated each year. Students are strongly encouraged to complete the surveys as they are an important avenue for students to "have their say". The feedback is anonymous and provides the Faculty with evidence of aspects that students are satisfied and areas for improvement.

Faculties have the option of administering the Unit Evaluation survey online through the my.monash portal or in class. Lecturers will inform students of the method being used for this unit towards the end of the semester.

Previous Student Evaluations of this unit
If you wish to view how previous students rated this unit, please go to
http://www.monash.edu.au/unit-evaluation-reports/

Over the past few years the Faculty of Engineering has made a number of improvements to its units as a result of unit evaluation feedback. Some of these benefits include tutor/demonstrator training, improved objectives and better feedback mechanisms.

Immediate feedback for us

According to past evaluations of this unit, we have set an improvement priority for this semester. It is to make the learning outcomes clearer; to make the unit more stimulating; to improve resources and to improve the level of tutoring and feedback.

Feedback is welcome at any time throughout the semester. Please use email to send it to the unit coordinator, or in person.

You may wish to use the open ended questions in the unit evaluation to provide written feedback on your experience of this and whether it has been helpful to you during this semester.

Teaching and Learning Method

The unit consists of lectures and practice classes with some computer laboratory activities. The concepts learned in the laboratory activities and lectures are applied to network programming assignments.

Tutorial allocation

There are 2-hours of laboratory and 1-hour of practical classes scheduled each week, commencing in week 2. Students must enrol in one practice class only using Allocate Plus. Students not allocated to a particular practice class will not be accepted into that session without the written consent of the unit co-ordinator. Once a particular session is full, no more students will be accepted, unless evidence is shown that timetabling means that is the only session possible.

Communication, participation and feedback

Monash aims to provide a learning environment in which students receive a range of ongoing feedback throughout their studies. In this unit it will take the form of group feedback via practice classes, individual feedback, peer feedback, self-comparison, verbal and written feedback, discussions in class, as well as more formal feedback related to assignment marks and grades. Students/You are encouraged to draw on a variety of feedback to enhance their/your learning.

Unit schedule

Week	Lecture	Prac	Lab	Assignment activity
1	Overview of the TCP/IP protocol suite, and operation of the Internet	No Prac	No labs	**Text book:** Read Sections 1.1 – 1.9, 3.1, 3.2, 4.1, 4.2, 4.4.1, 4.4.2 4.4.3 and review questions
2		Network programming practical examples – design patterns	Experiment 1	
3	Sockets and connections, socket programming		Experiment 2	**Text book:** Read Sections 2.1.1, 2.1.2, 2.7and review questions
4	Advanced DNS concepts and DHCP		Experiment 3	**Text book:** Read Sections 2.5, 4.4.2 and review questions
5	Peer-to-peer networks		Experiment 4	**Text book:** Read Sections 2.6and review questions
Mid-semester break				
6	Principles of reliable data transfer	Network programming practical examples – design patterns	Experiment 5	**Text book:** Read Sections 3.4 and review questions **Assignment 1:** TCP/IP Protocol Cracker Project is ***due in week 6***
7				
8	Router designs, fragmentation and re-assembly, IPv6		Network File transfer project	**Text book:** Read Sections 4.3, 4.4.1, 4.4.4 and review questions
9	Network security			**Text book:** Read Chapter 8 (except Section 8.7) and review questions **Assignment 2**: Network File Transfer Project is ***due in week 11***
10				
11				
12	Network management, SNMP		Experiment 6	**Text book:** Read Chapter 9 and review questions
13	**Revision**			

Unit Resources

Prescribed text(s) and readings

F. Kurose and K. Ross Computer Networking: A Top-Down Approach Featuring the Internet (5th edition), Addison-Wesley, 2009.

B. Hall, Beej's Guide to Network Programming: Using Internet Sockets (Available on-line through the Unit MUSO site)

Recommended text(s) and readings

R. Stevens, TCP/IP Illustrated Volume 1: The Protocols, Addison-Wesley, 1996

R. Stevens, UNIX Network Programming Volume 1: Networking APIs: Sockets and XTI (2nd ed.)

A. Leon-Garcia and I. Widjaja, Communication Networks: Fundamental Concepts and Key Architectures (2nd ed.), McGraw-Hill, 2004.

Library access

The Monash University Library site contains details about borrowing rights and catalogue searching. To learn more about the library and the various resources available, please go to http://www.lib.monash.edu.au

This unit has a reading list which you may find useful.

Monash University Studies Online (MUSO)

All unit and lecture materials are available through the MUSO (Monash University Studies Online) site. You can access this site by going to:

a) http://muso.monash.edu.au or

b) via the portal (http://my.monash.edu.au).

Click on the **My Units** tab, then the **Monash University Studies Online** hyperlink

In order for your MUSO unit(s) to function correctly, certain programs may need to be installed such as Java version 1.4.2. This can easily be done by going to http://www.monash.edu.au/muso/support/students/downloadables-student.html to update the relevant software.

You can contact the MUSO helpdesk by:

Phone (+61 3) 9903-1268 or 9903-2764

Operational hours (Monday – Thursday) – local time

Australia: 8 am to 10 pm (8pm Non Teaching period)

Malaysia: 6 am to 8 pm (6 pm Non Teaching period)

South Africa: 11pm to 1pm (11 am Non Teaching period)

Operational hours (Friday) – local time

Australia: 8 am to 8 pm

Malaysia: 6 am to 6 pm

South Africa: 11pm to 11 am

Operational hours (Saturday-Sunday) – local time (Teaching and Exam Period Only)

Australia: 1 pm to 5 pm

Malaysia: 11 am to 3 pm

South Africa: 4 am to 8 am

Further information can be obtained from the following site
http://www.monash.edu.au/muso/support/index.html

Assessment

Assessment tasks

Week	Submission Date	Activity	Value %
2	Week 2 allocated lab session time	Experiment 1 tasks	1%
3	Week 3 allocated lab session time	Experiment 2 tasks	1%
4	Week 4 allocated lab session time	Experiment 3 tasks	1%
5	Week 5 allocated lab session time	Experiment 4 tasks	1%
6	Week 6 allocated lab session time	Experiment 5 tasks	1%
6	16 April 2010 5:00 pm	TCP/IP Protocol Cracker	8%
11	21 May 2010 5:00 pm	Reliable File Transfer over Imperfect Links	16%
12	Week 12	Experiment 6 tasks	1%

	allocated lab session time		
		Total continuous assessment	30%
		Examination (x hours)	70%
		Total assessment	**100%**

The unit coordinator reserves the right to moderate the assessments given by the individual tutors. This process will occur at the end of the semester.

All assignments and experiments are single person activities. No group work is allowed. Under **no circumstances** program code to be shared.

To achieve a pass in the unit students must achieve an overall mark of 50% with a minimum mark of 45% for the project and 45% on the examination. (Note: These two minimum marks together will not achieve a clear pass. A mark below the project and/or examination minimum will result in the lower fail percentage being returned).

Assessment details and criteria

Assessment Task 1: TCP/IP Protocol Cracker
Details of task: (refer to the assignment handout)
Criteria for Assessment task 1: (refer to the assignment handout)

Assessment Task 2: Reliable File Transfer over Imperfect Links
Details of task: (refer to the assignment handout)
Criteria for Assessment task 2: (refer to the assignment handout)

Hard copy assignment submissions

All assignments will be submitted on-line. No printouts or floppy disks will be collected. Please refer to the unit's MUSO Web Site for details and submission procedure.

Students: You must keep a copy of your assignment in electronic format. We suggest you keep a print out also.

Electronic submission of assignments in MUSO

How it works

1. If Electronic Submission has been approved for your unit, use only the MUSO assignment submit tool. Do not submit files attached to email. Log into MUSO http://muso.monash.edu.au and select the unit for which you wish to submit work.

2. Unless you have made prior arrangement s with your lecturer, only the following file formats will be accepted: .doc, .rtf, .txt, .pdf, .html

3. It is essential you adhere to the following format for the naming of the file you wish to submit:
   a) It MUST contain your Authcate name.
   b) There must be NO SPACES in the filename.

4. You will receive a confirmation message within MUSO once you have successfully submitted your assignment within the electronic drop box.

5. Comments and grading of your assessment will be communicated to you either by MUSO, email, or post.

Instructions for submitting an assignment electronically using MUSO

1. Click on the Assignments icon on the relevant unit homepage. The Assignments screen displays.

2. Click on the assignment title for which you wish to submit your work.

3. Click on the **Add Attachments** button.

4. To locate your file, click on the **Upload File** button. The Upload File menu will appear.

5. Locate the assignment file you wish to upload by clicking on the **Browse** button.

6. Select the file and click on the **Open** button. The Upload File for Assignment screen appears with your uploaded file displayed.

7. Click on the **Save** button.

8. You will see a green tick next to your uploaded file. To confirm this is the file you wish to upload, click the **Add Selected** button.

9. Click on the **Submit** button. You'll see a confirmation window when your assignment has been successfully submitted.

10. To return to the MUSO homepage, click on the **Continue** button.

The rules
By submitting your assignment electronically you are deemed to have accepted these rules.

1. Late assignments will not be accepted electronically as the mailbox will be disabled at 5 pm on the due date.

2. You must keep a copy of your assignment in electronic format. We suggest you keep a print out also.

3. The cover page of your assignment must set out your name, student number, topic, tutor's name and a declaration that says

4. Remember that, just as for hard copy submissions, you should arrange your study /workload so as to allow plenty of time for last minute hitches. Computer problems/ busy servers will NOT be an excuse for an extension. Do not leave electronic submission of your assignment to the last minute.

Assignment coversheet

All assignments need to be submitted with a coversheet.

The faculty assessment coversheet is accessible on the faculty website under Current Students, Undergraduate and Graduate Coursework Students, Assessment, exams and results at:

http://www.eng.monash.edu.au/current-students/download/assessment-coversheet.pdf

University and faculty policy on assessment

Due dates and extensions

The due dates for the submission of assignments are given in the previous section. Please make every effort to submit work by the due dates. Students are advised to NOT assume that granting of an extension is a matter of course.

If you need an extension for any of the assignments, you must submit a written request 48-hours *before* the due time and date, and attach supportive evidence such as medical certificate.

The form should preferably be forwarded as an email attachment, sent to the unit coordinator. The email should be sent from your University email address with your name typed in lieu of signature.

Note that other lecturers cannot grant extensions. Lecturer-in-charge (unit coordinator) will indicate at the time of granting the extension whether any penalty in marks will apply to the submitted work.

If an extension is granted, the approval must be attached to the assignment.

Late assignment

If you are late in applying for an extension or you don't have a good reason, you should still submit the work, but 10% of the total marks available for that assessment component will usually be deducted for each day late.

No assignment will be accepted once an assignment has been returned to the class.

Deferred tests and examinations may be granted in cases of extenuating personal circumstances such as serious personal illness or bereavement.

Remember, you are required to keep an up-to-date copy of all submitted assignments to safeguard against the loss of work through accident or error.

Return dates

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

Assessment for the unit as a whole is in accordance with the provisions of the Monash University Education Policy at:

http://www.policy.monash.edu/policybank/academic/education/assessment/index.html

Plagiarism, cheating and collusion

The University regards most seriously any acts of dishonesty in assessment such as plagiarism, collusion, resubmission of previously marked work in different units, examination misconduct and theft of other students' work.

Plagiarism While some people incorrectly assume that plagiarism occurs only where someone copies verbatim, it really involves taking and using another person's ideas or work and passing these off as one's own by failing to give appropriate acknowledgement; that is, not indicating by referencing that the ideas expressed are not your own. Good scholarship is marked by an acknowledgement of the origin of ideas you use, develop or synthesise.

Collusion (or unauthorised collaboration) Means joint effort in preparing material submitted for assessment, between students or others, except where this has been approved by the lecturer-in-charge of the unit.

Cheating Means seeking to obtain an unfair advantage in an examination or in other written or practical work required to be submitted or completed by a student for assessment. Hence, if the passing off was done intentionally you have cheated, if it was not intentional, the offence you have committed is the academic misdemeanor of failing to reference a source correctly.

Acts of dishonesty in assessment could result in penalties, including failure in the unit and possible exclusion from the University. For further details please refer to the University's Discipline Statute (Statute 4.1).

University statements on plagiarism are contained in the University Discipline Statute 4.1 at: http://www.monash.edu.au/pubs/calendar/statutes/Statute04.html and accompanying guidelines at: http://www.adm.monash.edu.au/unisec/academicpolicies/policy/plagiarism.html and http://www.monash.edu.au/pubs/sii

Register of counselling about plagiarism

The University requires faculties to keep a simple and confidential register to record counselling to students about plagiarism (eg warnings). The register is accessible to Associate Dean Teaching (or nominee) and, where requested, students concerned have access to their own details in the register.

Non-discriminatory language

The Faculty of Engineering is committed to the use of non-discriminatory language in all forms of communication. Discriminatory language is that which refers in abusive terms to gender, race, age, sexual orientation, citizenship or nationality, ethnic or language background, physical or mental ability, or political or religious views, or which stereotypes groups in an adverse manner. This is not meant to preclude or inhibit legitimate academic debate on any issue; however, the language used in such debate should be non-discriminatory and sensitive to these matters. It is important to avoid the use

of discriminatory language in your written work. The most common form of discriminatory language in academic work tends to be in the area of gender inclusiveness. You are, therefore, requested to check your work for this and to ensure it is non-discriminatory in all respects.

Students with disabilities

Students with disabilities that may disadvantage them in assessment should seek advice from Faculty of Engineering Student Service staff and/or their Unit Coordinator before completing assessment tasks and examinations.

Special consideration – including deferred assessment

Special consideration in form of an extension etc may be awarded in cases of extenuating personal circumstances such as serious personal illness or bereavement. Deferred assessment (not to be confused with an extension for submission of an assignment) may also be granted in such circumstances. Refer to the Special Consideration webpage for eligibility criteria, forms etc: http://www.monash.edu.au/exams/special-consideration.html.
Special Consideration policy
Special Consideration procedures.

Related links

Responsibilities of Students

As a student of the University you have the following responsibilities:

- to apply yourself to your studies to the best of your abilities
- to become familiar with the rules and regulations governing the degree in which you are enrolled, and to ensure that the units selected meet the degree requirements
- to be aware of the policies and practices of the University and of any faculty and department in which you are enrolled, which are contained in the materials and information made available to you
- to be aware of the rules and regulations concerning the use of University computing, library and other facilities, as set out in published material
- to meet deadlines for work to be submitted
- to take the initiative and consult appropriately when problems arise
- to submit original work for assessment without plagiarising or cheating
- for on-campus students, to attend lectures, tutorials and seminars for each unit in which you are enrolled and, for off-campus students, to engage thoroughly with all course materials and participate in any prescribed residential schools
- to accept joint responsibility for your own learning
- to contribute to the development of University programs and policies by participating in consultative and deliberative processes in a responsible and ethical manner
- to be aware of the University's commitment to equal opportunity and to demonstrate tolerance and respect for all members of the University community
- to respect the right of staff members to express views and opinions
- to respect the working environment of others in all areas of the University
- to retain a copy of all assignment work submitted for assessment, and hold it until a grade for the unit has been published
- to regularly scan personal computers for viruses and other destructive software and to ensure that 'infections' are not transmitted to computers owned by the University, or to computers owned by other students, or by other individuals or organisations
- to regularly back-up documents, databases, presentations, spreadsheets and other files held on a personal computer which relate to your study at university and to arrange secure storage for these 'back-up' copies.
- to regularly check both the unit WebCT site and your official University email account.

University link to student and staff responsibilities:

http://www.adm.monash.edu.au/execserv/policies/Academic-Policies/policy/codes-of-practice-for-teaching-and-learning.html

Plagiarism, Cheating and Collusion

University link:

http://www.adm.monash.edu.au/execserv/policies/Academic-Policies/policy/plagarism-and-cheating.html

Faculty link:

http://www.eng.monash.edu.au/current-students/cheating-and-plagiarism.html

Ethical Behaviour

University link:

http://www.monash.edu.au/resgrant/human-ethics/index.html

Faculty link:

Occupational Health and Safety Policy Information for Students

University links:

http://www.adm.monash.edu.au/ohse/for/students.html

Also available on the OHSE website http://www.adm.monash.edu.au/ohse/:

Occupational health and safety policies, procedures and guidelines, which include:

Alcohol and other drugs policy
http://www.adm.monash.edu.au/ohse/documents/policies/alcohol-drugs.pdf

Environment policy
http://www.adm.monash.edu.au/ohse/documents/policies/environment-policy.pdf

Procedures for hazard and incident reporting, investigation and recording
http://www.adm.monash.edu.au/ohse/documents/procedures/incident-report.pdf

Immunisation policy
http://www.adm.monash.edu.au/ohse/documents/policies/Immunisation.pdf

Occupational health and safety policy
http://www.policy.monash.edu/policy-bank/management/student-comm-serv/ohse/index.html

Policy on first aid
http://www.adm.monash.edu.au/ohse/documents/policies/first-aid.pdf

Policy on the prevention of bullying and occupational violence at Monash
http://www.adm.monash.edu.au/ohse/documents/policies/bullying-violence.pdf,
to be used in conjunction with the Procedures for managing incidents of bullying and occupational violence in the workplace
http://www.adm.monash.edu.au/ohse/documents/procedures/bullying-violence.pdf

Policy with respect to smoking
http://www.adm.monash.edu.au/ohse/documents/policies/smoking.pdf

OHS procedures for work and study during times when emergency response is limited
http://www.adm.monash.edu.au/ohse/documents/procedures/after-hours.pdf

Procedures for health and safety issue resolution
http://www.adm.monash.edu.au/ohse/documents/procedures/issue-resolution.pdf

Pets on campus
http://www.adm.monash.edu.au/ohse/documents/others/pets-on-campus.html

Ergonomic guidelines Computer User Guide
http://www.adm.monash.edu.au/ohse/documents/index.html#E

Ergonomics at Monash - Computer Workplace Design Guidelines
http://www.adm.monash.edu.au/ohse/documents/index.html#E

Emergencies
For all non-medical emergencies in working hours, telephone extension 333.

For all emergencies out of normal hours, telephone extension 333.

Faculty link:
http://fsd.monash.edu.au/security