College of Engineering, Science and Environment

School of Electrical Engineering and Computing

ELEC3500: Telecommunication Networks

Callaghan

Semester 2 - 2021

COURSE OUTLINE

OVERVIEW

Course Description

This course provides an introduction to the principles & techniques of design, implementation, and analysis of communication networks which is the key technology for the modern ICT systems. Topics include: basis of voice, video, data and internet communications. network topologies, architecture. switching techniques, network design, basic queuing analysis, protocols. local and wide area networks, cellular wireless networks, TCP/IP/UDP/DHCP protocols, routing techniques, multicasting techniques. network security, Performance analysis and network simulation.

Assumed Knowledge

ELEC1710 or COMP2240 and STAT2110 or MATH1510

Contact Hours

Callaghan

Laboratory
Face to Face On Campus
3 hour(s) per Week for 5 Weeks

Lecture
Face to Face On Campus
3 hour(s) per Week for Full Term

Tutorial
Face to Face On Campus
1 hour(s) per Week for Full Term

Unit Weighting

10

Workload

Students are required to spend on average 120-140 hours of effort (contact and non-contact) including assessments per 10 unit course.

CONTACTS

Course Coordinator

Callaghan
A/Prof Duy Ngo
Duy.Ngo@newcastle.edu.au
(02) 4921 8947
Consultation: See the course Blackboard

Teaching Staff

Other teaching staff will be advised on the course Blackboard site.

School Office

School of Electrical Engineering and Computing
ATC 106
ATC Building
Callaghan
+61 2 4921 6026
8:30am to 4:30pm (Monday to Friday) AEST

SYLLABUS

Course Content

1. Packet switched communication, OSI & TCP/IP models
2. Network devices, transmission mediums, traffic sources
3. Error detection and correction techniques
4. Multiplexing, Statistical multiplexing and Multiple access techniques
5. Network queues and delay analysis
6. Local and Wide area networks, Virtual Network
7. Routing and Multicast routing protocols
8. Cellular wireless networks
9. TCP/IP/UDP/DHCP protocols
10. Network security

Course Learning Outcomes

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

1. Understand basic and some advanced concepts and techniques of telecommunications networks.

2. Develop problem solving approaches as applied in telecommunications networking areas.

3. Able to analyse performance of basic communication networks using both analytical and simulation techniques.

4. Understand telecommunication network design techniques and practical implementation issues.

5. Understand the basic properties of internet and telecommunications traffic properties.

Course Materials

Other Resources:

- Title: Communication Networks: Fundamental Concepts and Key Architectures
  Authors: Alberto Leon-Garcia and Indra Widjaja
  Publisher: McGraw Hill
  Edition: 2nd

Required Text:

- Title: Computer Networking: A Top-Down Approach

Authors: James F. Kurose and Keith W. Ross
Publisher: Peason Education Limited
Edition: 7th, Global Edition.
ISBN-13: 978-129215359

ASSESSMENTS

This course has 4 assessments. Each assessment is described in more detail in the sections below.

	Assessment Name	Due Date	Involvement	Weighting	Learning Outcomes
1	Assignments	- Assignment 1: 11.59 pm Friday of Week 5. - Assignment 2: 11.59 pm Friday of Week 12.	Individual	15%	1, 2, 3, 4, 5
2	Quizzes	Week 8	Individual	15%	1, 2, 3, 4
3	Lab Reports x 5	Friday of the following week.	Individual	20%	1, 2, 3, 4, 5
4	Formal Examination		Individual	50%	1, 2, 3, 5

Late Submissions The mark for an assessment item submitted after the designated time on the due date, without an approved extension of time, will be reduced by 10% of the possible maximum mark for that assessment item for each day or part day that the assessment item is late. Note: this applies equally to week and weekend days.

Assessment 1 - Assignments

Assessment Type Report
Purpose To assist understanding of theory, design and problem solving skills.
Description There are two individual assignments. Assignment 1 is worth 7.5% and Assignment 2 is worth 7.5% of the final mark.
Weighting 15%
Due Date - Assignment 1: 11.59 pm Friday of Week 5.

- Assignment 2: 11.59 pm Friday of Week 12.

Submission Method Online
Assessment Criteria See the course Blackboard site.
Return Method Online
Feedback Provided Online - .

Assessment 2 - Quizzes

Assessment Type Quiz
Purpose To assist understanding of basic concepts and development of problem-solving skills. Provide timely feedback on student's progress.
Description There is one mid-term quiz to be held during regular class hours in Week 8.

Non-programmable calculators are allowed.

More details are available on the course Blackboard site.
Weighting 15%
Length 90 minutes

Due Date	Week 8
Submission Method	In Class
Assessment Criteria	
Return Method	Specific Location School Office
Feedback Provided	Returned Work - .

Assessment 3 - Lab Reports x 4

Assessment Type	Report
Purpose	To assist understanding of course materials via laboratory experiments.
Description	Four simulation experiments based on OMNET++ will be carried out in the laboratory. The labs are scheduled for Weeks 3 (Lab #1), 5 (Lab #2), 7 (Lab #3), 9 (Labs #3 and #4) , 11 (Lab #4) of the semester. Four lab reports are to be submitted. Each student is to submit a project report, which will contain a group section and an individual section where specific questions need to be answered.
Weighting	20%
Length	Each laboratory session is 3 hours
Due Date	Friday of the following week.
Submission Method	Online
Assessment Criteria	
Return Method	Online
Feedback Provided	Online - .

Assessment 4 - Formal Examination

Assessment Type	Formal Examination
Purpose	To test knowledge of the subject area.
Description	Restricted open-booked exam
Weighting	50%
Length	2 hours
Due Date	
Submission Method	Formal Exam
Assessment Criteria	
Return Method	Not Returned
Feedback Provided	No Feedback - .

ADDITIONAL INFORMATION

Grading Scheme

This course is graded as follows:

Range of Marks	Grade	Description
85-100	High Distinction (HD)	Outstanding standard indicating comprehensive knowledge and understanding of the relevant materials; demonstration of an outstanding level of academic achievement; mastery of skills*; and achievement of all assessment objectives.
75-84	Distinction (D)	Excellent standard indicating a very high level of knowledge and understanding of the relevant materials; demonstration of a very high level of academic ability; sound development of skills*; and achievement of all assessment objectives.
65-74	Credit (C)	Good standard indicating a high level of knowledge and understanding of the relevant materials; demonstration of a high level of academic achievement; reasonable development of skills*; and achievement of all learning outcomes.
50-64	Pass (P)	Satisfactory standard indicating an adequate knowledge and understanding of the relevant materials; demonstration of an

		adequate level of academic achievement; satisfactory development of skills*; and achievement of all learning outcomes.
0-49	Fail (FF)	Failure to satisfactorily achieve learning outcomes. If all compulsory course components are not completed the mark will be zero. A fail grade may also be awarded following disciplinary action.

*Skills are those identified for the purposes of assessment task(s).

Attendance

Attendance/participation will be recorded in the following components:

- Laboratory (Method of recording: Signing of the attendance sheet)

For laboratory attendance exemptions due to unavoidable reasons, students must seek approval from the course coordinator. Lab report(s) will not be marked if either the corresponding laboratory session is NOT attended or an approval is NOT granted by the course coordinator.

WH&S Requirements

Must successfully complete the Laboratory access and induction quiz.

Communication Methods

Communication methods used in this course include:

- Blackboard Course Site: Students will receive communications via the posting of content or announcements on the Blackboard course site.
- Face to Face: Communication will be provided via face to face meetings or supervision.

Course Evaluation

Each year feedback is sought from students and other stakeholders about the courses offered in the University for the purposes of identifying areas of excellence and potential improvement.

Oral Interviews

As part of the evaluation process of any assessment item in this course an oral examination may be conducted. The purpose of the oral examination is to verify the authorship of the material submitted in response to the assessment task. The oral examination will be conducted in accordance with the principles set out in the Oral Examination Guidelines. In cases where the oral examination reveals the assessment item may not be the student's own work the case will be dealt with under the Student Conduct Rule.

Academic Misconduct

All students are required to meet the academic integrity standards of the University. These standards reinforce the importance of integrity and honesty in an academic environment. Academic Integrity policies apply to all students of the University in all modes of study and in all locations. For the Student Academic Integrity Policy, refer to https://policies.newcastle.edu.au/document/view-current.php?id=35.

Adverse Circumstances

The University acknowledges the right of students to seek consideration for the impact of allowable adverse circumstances that may affect their performance in assessment item(s). Applications for special consideration due to adverse circumstances will be made using the online Adverse Circumstances system where:

1. the assessment item is a major assessment item; or
2. the assessment item is a minor assessment item and the Course Co-ordinator has specified in the Course Outline that students may apply the online Adverse Circumstances system;
3. you are requesting a change of placement; or
4. the course has a compulsory attendance requirement.

Before applying you must refer to the Adverse Circumstance Affecting Assessment Items Procedure available at:
https://policies.newcastle.edu.au/document/view-current.php?id=236

Important Policy Information

The 'HELP for Students' tab in UoNline contains important information that all students should be familiar with, including various systems, policies and procedures.

Graduate Profile Statement

Bachelor of Engineering

	University of Newcastle Bachelor of Engineering Graduate Profile Statements	Taught	Practised	Assessed	Level of capability
	Knowledge Base				
1	1.1. Comprehensive, theory based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline.	☑	☑		**1 & 2**
2	1.2. Conceptual understanding of the, mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline.	☑	☑		**1 & 2**
3	1.3. In-depth understanding of specialist bodies of knowledge within the engineering discipline.	☑	☑	☑	**1 & 2**
4	1.4. Discernment of knowledge development and research directions within the engineering discipline.	☑	☑	☑	**1 & 2**
5	1.5. Knowledge of contextual factors impacting the engineering discipline.				
6	1.6. Understanding of the scope, principles, norms, accountabilities and bounds of contemporary engineering practice in the specific discipline.				
	Engineering Ability				
7	2.1. Application of established engineering methods to complex engineering problem solving.	☑	☑	☑	**1 & 2**
8	2.2. Fluent application of engineering techniques, tools and resources.	☑	☑	☑	**1 & 2**
9	2.3. Application of systematic engineering synthesis and design processes.				
10	2.4. Application of systematic approaches to the conduct and management of engineering projects.				
	Professional Attributes				
11	3.1. Ethical conduct and professional accountability				
12	3.2. Effective oral and written communication in professional and lay domains.	☑	☑	☑	**1 & 2**
13	3.3. Creative, innovative and pro-active demeanour.				
14	3.4. Professional use and management of information.				
15	3.5. Orderly management of self, and professional conduct.				
16	3.6. Effective team membership and team leadership.				

This course outline was approved by the Head of School. No alteration of this course outline is permitted without Head of School approval. If a change is approved, students will be notified and an amended course outline will be provided in the same manner as the original.