ELEC3500: Telecommunication Networks

Callaghan Semester 2 - 2023



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

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

Tutorial

10

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

Unit Weighting

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



www.newcastle.edu.au CRICOS Provider 00109J



CONTACTS

Course Coordinator	Callaghan A/Pr Duy Ngo Duy.Ngo@newcastle.edu.au (02) 4921 8947 Consultation: See the course Canvas site
Teaching Staff	Other teaching staff will be advised on the course Canvas site.
School Office	School of Engineering EAG03 EA Building Callaghan +61 2 4921 5798 9.00am-1.00pm and 2.00pm-5.00pm (Monday to Friday)

SYLLABUS

Course Content	1. 2. 3. 4. 5. 6. 7. 8. 9. 10.	Packet switched communication, OSI & TCP/IP models Network devices, transmission mediums, traffic sources Error detection and correction techniques Multiplexing, Statistical multiplexing and Multiple access techniques Network queues and delay analysis Local and Wide area networks, Virtual Network Routing and Multicast routing protocols Cellular wireless networks TCP/IP/UDP/DHCP protocols Network security				
Course Learning Outcomes	On s 1.	Successful completion of this course, students will be able to: 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 an simulation techniques.				
	4.	Understand telecommunication network design techniques and practical implementati issues.				
	5.	Understand the basic properties of internet and telecommunications traffic properties.				
Course Materials	Othe	er 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	To be announced on the course Canvas site.	Individual	15%	1, 2, 3, 4, 5
2	Quizzes	To be announced on the course Canvas site.	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	University exam period	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	
Weighting	15%
Due Date	To be announced on the course Canvas site.
Submission Method	Online
Assessment Criteria	See the course Canvas 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 lecture hours.
	Non-programmable calculators are allowed.
	More details are available on the course Canvas site.
Weighting	15%
Length	To be announced
Due Date	To be announced on the course Canvas site.
Submission Method	In Class
Assessment Criteria	
Return Method	Specific Location
	School Office
Feedback Provided	Returned Work

Assessment 3 - Lab Reports x 5

Assessment Type Purpose Description	Report To assist understanding of course materials via laboratory experiments. The labs are scheduled for Weeks 3, 5, 7, 9, 11 of the semester. Simulation experiments based on OMNET++ software are carried out in the laboratory. Written lab reports are to be
Weighting Due Date	submitted. 20% Friday of the following week
Submission Method Assessment Criteria	Online
Return Method Feedback Provided	Online 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	University exam period
Submission Method	Formal Exam
Assessment Criteria	
Return Method	Not Returned
Feedback Provided	No Feedback

ADDITIONAL INFORMATION

Grading Scheme	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 th	ose identified	for the purposes of assessment task(s).						
Attendance	Attendance/p - Labor	participation w atory (Method	ill be recorded in the following components: of recording: Signing of the attendance sheet)						
	For laboratory attendance exemptions due to unavoidable reasons, students must see 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 th course coordinator.								
WH&S Requirements	Must succes	sfully complete	e the Laboratory access and induction quiz.						
Communication Methods	Communicat - Canva or anr	ion methods u as Course Site nouncements	sed in this course include: Students will receive communications via the posting of content on the Canvas course site.						

- Face to Face: Communication will be provided via face to face meetings or supervision.



Course Evaluation	Ead	ch ye	ear feedbacl	k is s	ough	nt from stud	ent	s and other s	stakeho	lder	s about the o	course	es offered
	in	the	University	for	the	purposes	of	identifying	areas	of	excellence	and	potential
	Imb	prove	ement.										

Oral Interviews (Vivas) As part of the evaluation process of any assessment item in this course an oral examination (viva) 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 <u>Oral Examination (viva) Procedure</u>. 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 <u>Student Conduct Rule</u>.

- 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 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 PolicyThe Help button in the Canvas Navigation menu contains helpful information for using the
Learning Management System. Students should familiarise themselves with the policies
and procedures at https://www.newcastle.edu.au/current-students/no-room-for/policies-and-procedures that support a safe and respectful environment at the University.

This course outline was approved by the Head of School on 27.06.2023. 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.

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Graduate Profile Statements – ELEC3500 – Semester 2 2023

This course builds students' capacity in the following University of Newcastle Bachelor of Engineering Graduate Profile Statements (based on 2011 Engineers Australia revised Stage 1 Competency Standards for Professional Engineers):

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