School of Electrical Engineering & Telecommunications

UNSW Engineering

TELE9781

Special Topics in Telecommunications 1

Term 3, 2021

Course Overview

Staff Contact Details

Convenors

Name	Email	Availability	Location	Phone
Robert Malaney	r.malaney@unsw.edu.au	Wednesday 5-10pm	R407	02 9385 6580

School Contact Information

Consultations: Lecturer consultation times will be advised during the first lecture. You are welcome to email the tutor or laboratory demonstrator, who can answer your questions on this course and can also provide you with consultation times. ALL email enquiries should be made from your student email address with ELEC/TELExxxx in the subject line; otherwise they will not be answered.

Keeping Informed: Announcements may be made during classes, via email (to your student email address) and/or via online learning and teaching platforms – in this course, we will use Moodle https://moodle.telt.unsw.edu.au/login/index.php. Please note that you will be deemed to have received this information, so you should take careful note of all announcements.

Student Support Enquiries

For enrolment and progression enquiries please contact Student Services

Web

Electrical Engineering Homepage

Engineering Student Support Services

Engineering Industrial Training

UNSW Study Abroad and Exchange (for inbound students)

UNSW Future Students

Phone

(+61 2) 9385 8500 – Nucleus Student Hub

(+61 2) 9385 7661 – Engineering Industrial Training

(+61 2) 9385 3179 – UNSW Study Abroad and UNSW Exchange (for inbound students)

Email

Engineering Student Support Services – current student enquiries

- e.g. enrolment, progression, clash requests, course issues or program-related queries

Engineering Industrial Training – Industrial training questions

UNSW Study Abroad – study abroad student enquiries (for inbound students)

UNSW Exchange – student exchange enquiries (for inbound students)

UNSW Future Students – potential student enquiries

- e.g. admissions, fees, programs, credit transfer

Course Details

Units of Credit 6

Summary of the Course

This course is designed to be built on the expertise gained in Tele9757 Quantum Communications. In this advanced version of quantum communications, we will move much closer to real working quantum communication systems. The course consists of 1 hours of lectures and 2 hours of Matlab Project work.

Course Aims

Going deeper into the details of how quantum communication systems work in practice, the course will expose you to many issues not covered in Tele9757. The mode of learning will be largely 1 hour lectures followed by a 2 hour laboratory in which you will carry out simulation exercises using Matlab. Additional online lectures may be used to assist with the needed theoretical background.

Course Learning Outcomes

After successfully completing this course, you should be able to:

Learning Outcome	EA Stage 1 Competencies
1. Understand at a deeper level than Tele9757 the theory, concepts and challenges and implementations of quantum mechanics as applied to communications.	PE1.1, PE1.2, PE1.3, PE1.5
2. Learn implementations of transferring quantum information over a network.	PE2.1, PE2.2, PE2.3, PE2.4
3. Understand how quantum protocols applications are implemented over a quantum communication channel.	PE2.1, PE2.2
4. Be able to design and implement in Matlab the behavior of quantum networks.	PE2.3

Teaching Strategies

The teaching in this course aims at establishing a good fundamental understanding of the areas covered using:
• Formal lectures, which provide you with a focus on the core analytical material in the course, together with qualitative, alternative explanations to aid your understanding; (Note in 2021 the class will be enireley online due to Covid restrictions)
• Matlab tutorials in which you are required to implement various aspects of quantum communication protocols. Learning in this course
You are expected to attend all lectures and laboratory work. This is compulsory for this course You must prepare well for your laboratory classes and your lab work will be
assessed.

Tutorials:
Each week we will go over a short tutorial problem set. Some of the tutorial set may be given to you

during the class and worked on during the same class. Others may be done in class one week after being released. These tutorials are not compulsory, will not be marked and do not form any part of the final class mark. You are strongly encouraged to attempt these tutorials - if you do not you will likely struggle in this class.

Additional Course Information

In addition to the lecture notes/video, you should read relevant sections of the recommended text. Reading additional texts will further enhance your learning experience. Group learning is also encouraged. UNSW assumes that self-directed study of this kind is undertaken in addition to attending classes throughout the course.

Assessment

Assessment task	Weight	Due Date	Course Learning Outcomes Assessed
1. Laboratory 1-3	30%	06/10/2021 06:00 PM	1, 3
2. Laboratory 3-6	30%	27/10/2021 06:00 PM	3
3. Laboratory 7-8.	20%	10/11/2021 06:00 PM	4
4. Laboratory 9	20%	17/11/2021 06:00 PM	1, 4

Assessment 1: Laboratory 1-3

Start date: 13/09/2021 06:00 PM
Assessment length: 3 weeks
Due date: 06/10/2021 06:00 PM
Marks returned: 06/10/2021 09:00 PM

In this assessment, you will be marked for your combined effort in Laboratory 1, 2, and 3.

Assessment criteria

Full Marks: Show full working code: Provide graphical output from code that demonstrates that all aspects of the laboratory exercises are implemented and working: Provide full written description of code with technical description of all its elements including all necessary mathematical and technical descriptions.

Pass Marks: Show code partially operational but not all elements working: Provide graphical output from code that demonstrates that half of the laboratory exercises are implemented and working: Provide full written description of code with technical description of all its elements that are operational including all necessary mathematical and technical descriptions.

Assessment 2: Laboratory 3-6

Start date: 06/10/2021 06:00 PM
Assessment length: 3 Weeks
Due date: 27/10/2021 06:00 PM
Marks returned: 27/10/2021 9:00 PM

In this assessment, you will be marked for your combined effort in Laboratory 4, 5, and 6.

Assessment criteria

Full Marks: Show full working code: Provide graphical output from code that demonstrates that all aspects of the laboratory exercises are implemented and working: Provide full written description of code with technical description of all its elements including all necessary mathematical and technical descriptions.

Pass Marks: Show code partially operational but not all elements working: Provide graphical output from code that demonstrates that half of the laboratory exercises are implemented and working: Provide full written description of code with technical description of all its elements that are operational including all necessary mathematical and technical descriptions.

Assessment 3: Laboratory 7-8.

Start date: 27/10/2021 06:00 PM
Assessment length: 2 weeks
Due date: 10/11/2021 06:00 PM
Marks returned: 10/11/2021 9:00 PM

In this assessment, you will be marked for your combined effort in Laboratory 7 and 8.

Assessment criteria

Full Marks: Show full working code: Provide graphical output from code that demonstrates that all aspects of the laboratory exercises are implemented and working: Provide full written description of code with technical description of all its elements including all necessary mathematical and technical descriptions.

Pass Marks: Show code partially operational but not all elements working: Provide graphical output from code that demonstrates that half of the laboratory exercises are implemented and working: Provide full written description of code with technical description of all its elements that are operational including all necessary mathematical and technical descriptions.

Assessment 4: Laboratory 9

Start date: 10/11/2021 06:00 PM
Assessment length: 1 Week
Due date: 17/11/2021 06:00 PM
Marks returned: 17/11/2021 9:00 PM

In this assessment, you will be marked for your effort in Laboratory 9.

Assessment criteria

Full Marks: Show full working code: Provide graphical output from code that demonstrates that all aspects of the laboratory exercises are implemented and working: Provide full written description of code with technical description of all its elements including all necessary mathematical and technical descriptions.

Pass Marks: Show code partially operational but not all elements working: Provide graphical output from code that demonstrates that half of the laboratory exercises are implemented and working: Provide full written description of code with technical description of all its elements that are operational including all necessary mathematical and technical descriptions.

Attendance Requirements

Students are strongly encouraged to attend all classes and review lecture recordings.

Resources

Prescribed Resources

Students should have Matlab access on home computers.

Recommended Resources

Students should have Matlab access on home computers.

Course Evaluation and Development

UNSW's MyExperience will be promoted in class. Additional tutorial exercises added this year due to previous feedback.

Academic Honesty and Plagiarism

Academic Honesty and Plagiarism

Plagiarism is the unacknowledged use of other people's work, including the copying of assignment works and laboratory results from other students. Plagiarism is considered a form of academic misconduct, and the University has very strict rules that include some severe penalties. For UNSW policies, penalties and information to help you avoid plagiarism, see https://student.unsw.edu.au/plagiarism. To find out if you understand plagiarism correctly, try this short quiz: https://student.unsw.edu.au/plagiarism-quiz.

General Conduct and Behaviour

Consideration and respect for the needs of your fellow students and teaching staff is an expectation. Conduct which unduly disrupts or interferes with a class is not acceptable and students may be asked to leave the class.

Academic Information

COVID19 - Important Health Related Notice

Your health and the health of those in your class is critically important. You must stay at home if you are sick or have been advised to self-isolate by NSW health or government authorities. Current alerts and a list of hotspots can be found here. **You will not be penalised for missing a face-to-face activity due to illness or a requirement to self-isolate**. We will work with you to ensure continuity of learning during your isolation and have plans in place for you to catch up on any content or learning activities you may miss. Where this might not be possible, an application for fee remission may be discussed.

If you are required to self-isolate and/or need emotional or financial support, please contact the Nucleus: Student Hub. If you are unable to complete an assessment, or attend a class with an attendance or participation requirement, please let your teacher know and apply for special consideration through the Special Consideration portal. To advise the University of a positive COVID-19 test result or if you suspect you have COVID-19 and are being tested, please fill in this form.

UNSW requires all staff and students to follow NSW Health advice. Any failure to act in accordance with that advice may amount to a breach of the Student Code of Conduct. Please refer to the Safe Return to Campus guide for students for more information on safe practices.

Dates to note

Important Dates available at: https://student.unsw.edu.au/dates

Student Responsibilities and Conduct

Students are expected to be familiar with and adhere to all UNSW policies (see https://student.unsw.edu.au/policy), and particular attention is drawn to the following:

Workload

It is expected that you will spend at least **15 hours per week** studying a 6 UoC course, from Week 1 until the final assessment, including both formal classes and *independent, self-directed study*. In periods where you need to complete assignments or prepare for examinations, the workload may be greater. Over-commitment has been a common source of failure for many students. You should take the required workload into account when planning how to balance study with employment and other activities.

Attendance

Regular and punctual attendance at all classes is expected. UNSW regulations state that if students attend less than 80% of scheduled classes they may be refused final assessment.

Work Health and Safety

UNSW policy requires each person to work safely and responsibly, in order to avoid personal injury and to protect the safety of others.

Special Consideration and Supplementary Examinations

You must submit all assignments and attend all examinations scheduled for your course. You can apply for special consideration when illness or other circumstances beyond your control interfere with an assessment performance. If you need to submit an application for special consideration for an exam or assessment, you must submit the application **prior to the start** of the exam or before the assessment is submitted, except where illness or misadventure prevent you from doing so. Be aware of the "fit to sit/submit" rule which means that if you sit an exam or submit an assignment, you are declaring yourself well enough to do so and cannot later apply for Special Consideration. For more information and how to apply, see https://student.unsw.edu.au/special-consideration.

Administrative Matters

On issues and procedures regarding such matters as special needs, equity and diversity, occupational health and safety, enrolment, rights, and general expectations of students, please refer to the School and UNSW policies:

https://student.unsw.edu.au/guide

https://www.engineering.unsw.edu.au/electrical-engineering/resources

Image Credit

Synergies in Sound 2016

CRICOS

CRICOS Provider Code: 00098G

Acknowledgement of Country

We acknowledge the Bedegal people who are the traditional custodians of the lands on which UNSW Kensington campus is located.

Appendix: Engineers Australia (EA) Professional Engineer Competency Standard

Program Intended Learning Outcomes	
Knowledge and skill base	
PE1.1 Comprehensive, theory based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline	✓
PE1.2 Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline	✓
PE1.3 In-depth understanding of specialist bodies of knowledge within the engineering discipline	✓
PE1.4 Discernment of knowledge development and research directions within the engineering discipline	
PE1.5 Knowledge of engineering design practice and contextual factors impacting the engineering discipline	✓
PE1.6 Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice in the specific discipline	
Engineering application ability	
PE2.1 Application of established engineering methods to complex engineering problem solving	✓
PE2.2 Fluent application of engineering techniques, tools and resources	✓
PE2.3 Application of systematic engineering synthesis and design processes	✓
PE2.4 Application of systematic approaches to the conduct and management of engineering projects	✓
Professional and personal attributes	
PE3.1 Ethical conduct and professional accountability	
PE3.2 Effective oral and written communication in professional and lay domains	
PE3.3 Creative, innovative and pro-active demeanour	
PE3.4 Professional use and management of information	
PE3.5 Orderly management of self, and professional conduct	
PE3.6 Effective team membership and team leadership	