GSOE9758
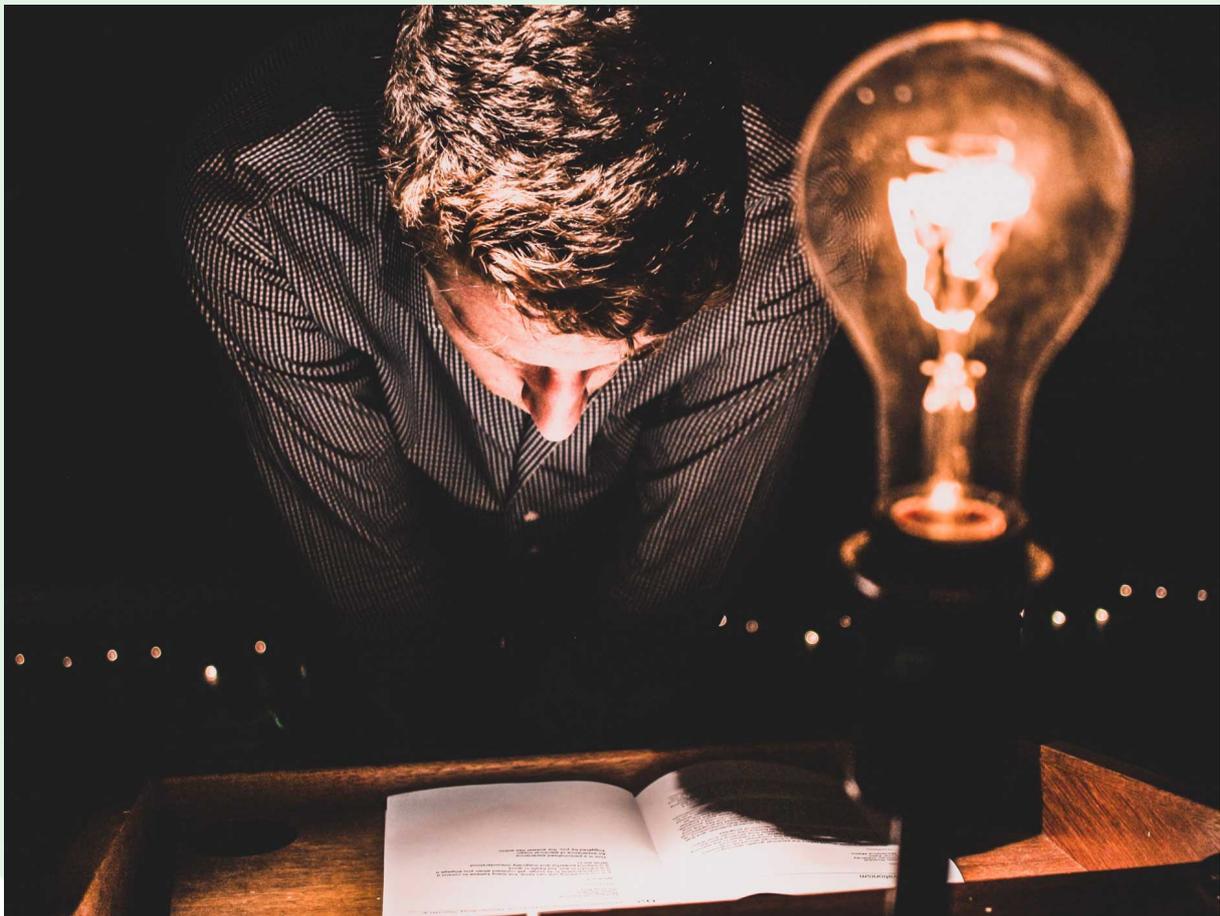
Network Systems Architecture

Term 1, 2022

Course Overview

Staff Contact Details

Convenors

Name	Email	Availability	Location	Phone
Vijay Sivaraman	vijay@unsw.edu.au	Mon 9am-4pm	G17 Room 443	9385 6577

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

Pre-requisites: Background in data networks, e.g. TELE3118, COMP3331/9331

This course aims to provide understanding of the design of enterprise and telecommunications network architecture. It will bring together in-depth coverage of various networking technologies (such as TCP/IP, security, wireless LAN 802.11 etc) in order to provide practical context and integration requirements for real-world applications. It covers the methodology behind the design of building enterprise and core networks to support applications that include data, voice and video. Telecommunications architecture will cover IP Multimedia Systems (IMS) and IP Next Generation Networks (IP NGN). Enterprise architecture will review segments within corporate networks referred to as "Places in the Network" (PINs) such as Data Centres, Wide Area Networking (WANs) and remote branches. Other practical applications will include a review of the Australian National Broadband Network (NBN), Cloud Computing and mobile computing.

Course Learning Outcomes

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

Learning Outcome	EA Stage 1 Competencies
1. Describe the process of architecting a networking system	PE1.2, PE1.6
2. Collect and categorise the requirements of the system	PE1.3, PE2.1
3. Evaluate architectural components that best meet the requirements	PE1.4, PE2.3
4. Analyse the interaction of the components and their trade-offs	PE2.3, PE2.4
5. Develop broad design of network systems for specific deployment scenarios	PE3.2, PE3.4

Teaching Strategies

Please refer to the information in Moodle

Assessment

Assessment task	Weight	Due Date	Course Learning Outcomes Assessed
1. Project	50%	Not Applicable	2, 3, 4, 5
2. Mid-session Test	20%	Not Applicable	1, 3, 4
3. Final Exam	30%	Not Applicable	1, 2, 3, 4, 5

Assessment 1: Project

A project will require you to architect a real-world networking system from requirements analysis to final design. You will have to present the first stage of your project on requirements and business model in-class in week 5, followed by a second stage presentation in week 8 on the architecture and evaluation. Each presentation is worth 15% of the grade, and a final report (worth 20% of the grade) will be due at the end of week 10 that will contain a comprehensive description of the business model, architecture, and evaluation of your system. Late submissions will generally not be accepted.

This is not a Turnitin assignment

Assessment criteria

Assessment is based on two class presentations and a final report.

Assessment 2: Mid-session Test

This course will have an in-lecture written test of 1.5 hours that will evaluate and provide feedback on your understanding of the material in this course. The test will be held in class in week 6. Re-tests will not be granted in the event that a student misses the test, unless satisfactory written evidence is presented of adverse conditions that prevented the student from taking the test. In such a case, the course coordinator may, at his discretion, conduct the re-test orally with the individual student, typically within two weeks of the original test date.

Assessment 3: Final Exam

This two-hour final exam scheduled by the University will test your overall competency in the course.

Attendance Requirements

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

Course Schedule

[View class timetable](#)

Timetable

Date	Type	Content
Week 1: 14 February - 18 February	Lecture	Introduction to the Architecture process
Week 2: 21 February - 25 February	Lecture	Business Model Canvas (BMC): Visions, Goals, Requirements (VGR)
Week 3: 28 February - 4 March	Lecture	Telco, Cloud, and Exchange Architectures
Week 4: 7 March - 11 March	Lecture	National Broadband Network (NBN)
Week 5: 14 March - 18 March	Presentation	Project stage 1 presentation
Week 6: 21 March - 25 March	Assessment	Mid-term test
Week 7: 28 March - 1 April	Lecture	IoT Networks
Week 8: 4 April - 8 April	Presentation	Project stage 2 presentation
Week 9: 11 April - 15 April	Lecture	Programmable Networks
Week 10: 18 April - 22 April	Homework	Review

Resources

Prescribed Resources

The recommended (though not required) reference books for this course are: (a) Priscilla Oppenheimer, "Top-Down Network Design", Third Edition, Cisco Press, 2010, and (b) James D. McCabe, "Network Analysis, Architecture, and Design", 3rd Edition, Morgan-Kaufman, 2007.

Recommended Resources

Sections from various other books, papers, and other reading material will be used throughout this course; information about these will be posted on the course Moodle page andf the web-page: https://subjects.ee.unsw.edu.au/gsoe9758/

Course Evaluation and Development

This course is under constant revision in order to improve the learning outcomes for allstudents. Please forward any feedback (positive or negative) on the course to the course convener or via the Course and Teaching Evaluation and Improvement Process. You can also provide feedback to ELSOC who will raise your concerns at student focus group meetings. As a result of previous feedback obtained for this course and in our efforts to provide a rich and meaningful learning experience, we have continued to evaluate and modify our delivery and assessment methods.

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	