Course Overview

Staff Contact Details

Convenors

Name	Email	Availability	Location	Phone
Robert Nordon	r.nordon@unsw.edu.au	Email	Room 508, Level 5, Samuels Building	61 2 93850559

Lecturers

Name	Email	Availability	Location	Phone
Reza Argha	a.argha@unsw.edu.au	email		

School Contact Information

Student Services can be contacted via unsw.to/webforms.

The tutorials aim to apply signal analysis to biological signals and medical devices. Laboratories will teach the basics of signal acquisition, sampling and analysis in the time and frequency domains using USB signal generators and oscilloscopes to acquire electronic signals. These laboratories will be conducted face-to-face in active learning spaces. The student will also master Matlab signal acquisition software.

Collaborative learning and project management will be developed through group work including the laboratory activities and a major group project.

Additional Course Information

Presumed knowledge and skills

It is expected that the student has completed one year of university mathematics or the equivalent. Integral calculus and complex numbers will play a particularly important role in the course. Some experience in computing (any language) is desirable but not required. Extensive instruction in using Matlab and Simulink will be provided.

	function)
Digital sampling	Application of signal analysis theory to electrical signals
Discrete Fourier transform I	Representation of a continuous signal as a delta train (shah function)
	Definition (DFT versus DTFT)
	Convolution theorem
Discrete Fourier transform II	Introduction to ideal sampling
	Aliasing and Nyquist rate
	zero padding
z-transform	z-transform

Criteria	Mark
Partial analysis	0.5
Complete analysis	1
*Criteria for complete analysis:	

f) additional analysis or refinement or value-add to the group’s output (slide show and shared material) conducted by yourself. (2 marks)

Criteria	Mark
Does not report what was shared between group members, and acknowledges the contribution of individual members	0
Resolves additional minor issues not solved by the group e.g., enhances literature review	1
Resolves additional major issues not solved by the group e.g., modified controller design to increase patient survival.	2

Assessment 2: Major topics online quizzes

There will be 5 online quizzes that will assess signal analysis theory covering 1) Linear time-invariant systems 1 2) Linear time-invariant systems 2 3) Fourier Transform 4) Digital Sampling 5) Z-transform and Digital Filtering. They will be based upon online learning activities for each of these major topics. The online quiz will be before the lab tutorial and lecture (10-11am) on 28-Sep, 5-Oct, 12-Oct, 26-Oct, 16-Nov.

Assessment 3: Lab reports

There will be two lab reports (10 % each) based on analogue and digital signal processing labs. It is mandatory to attend all laboratory practical sessions face-to-face if possible. You will be acquiring valuable data that will go in final reports. For online overseas students we will provide online demonstration sessions for you to acquire the data for the lab reports.

Fourier transform lab due on 18-Oct (11:59 pm) 2. Digital sampling lab due on 25-Oct (11:59 pm).

Assessment 4: Online Math Revisions Quiz

Due date: 27/09/2022 11:59 PM

These quizzes will assess Maths and Matlab prerequisites for this course.

Assessment 5: Major assignment

Due date: 15/11/2021 11:59 PM

Major assignment

Week 6: 17 October - 21 October	Group Work	Group formation, project selection (supplied) and allocation of roles and responsibilities. Acquisition of signal for the project (supplied).
	Group Work	Medical Device Design (RN/RA)
Week 7: 24 October - 28 October	Tut-Lab	z-transform and introduction to digital filtering. Using Matlab to design digital filters (RA)
	Tut-Lab	Evaluating z-functions on the unit circle. DFT with zero-padding. Explore the effects of windowing. Ad-hoc filter design and difference equation implementation. FIR and IIR filter design. (Tutorial)
Week 8: 31 October - 4 November	Tut-Lab	Ziegler-Nichols tuning of PID controllers (Tutorial)
	Tut-Lab	PID control (RA). Using Matlab/Simulink to design and tune control system
	Tut-Lab	Matlab exercises (Practical)
Week 9: 7 November - 11 November	Online Activity	Digital sampling online quiz 10-11 am (8%)
	Tut-Lab	Sampling and spectral analysis of biological signals (RA)
	Tut-Lab	Periodogram and short time Fourier transform (tutorial)

Group Work

(tutorial)

Resources

Prescribed Resources

All material will be provided via Moodle. Teams tutorials will be recorded.

Recommended Resources

DATES TO NOTE

Refer to MyUNSW for Important Dates.

PLAGIARISM

Beware! An assignment that includes plagiarised material will receive a 0% Fail, and students who plagiarise may fail the course. Students who plagiarise will have their names entered on plagiarism register and will be liable to disciplinary action, including exclusion from enrolment.

It is expected that all students must at all times submit their own work for assessment. Submitting the work or ideas of someone else without clearly acknowledging the source of borrowed material or ideas, is plagiarism.

All assessments which you hand in must have a Non Plagiarism Declaration Cover Sheet. This is for both individual and group work. Attach it to your assignment before submitting it to the Course Coordinator or at the School Office.

Plagiarism is the use of another person's work or ideas as if they were your own. When it is necessary or desirable to use other people's material you should adequately acknowledge whose words or ideas they are and where you found them (giving the complete reference details, including page number(s)). The Learning Centre provides further information on what constitutes Plagiarism at:

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

ACADEMIC ADVICE

Last year we had problems with contract cheating and 'sharing' of assignment answers which are very serious breaches of academic conduct. Please read the student conduct policy and the academic misconduct procedure. It is expected that students attend all lectures and tutorial sessions.

Assignments submitted after the due date without prior notification and permission will be subject to a deduction in marks.

UNSW has a wide range of student support services. The resources listed below should be used by students needing assistance related to aspects of their overall University experience. Specific help regarding this course can be sought from the course coordinator.

http://www.student.unsw.edu.au/

https://my.unsw.edu.au/student/howdoi/HowDoI_MainPage.html http://www.counselling.unsw.edu.au/

Those students who have a disability that requires some adjustment in their teaching or learning environment are encouraged to discuss their study needs with the course coordinator prior to, or at the commencement of, their course, or with Disability Support Services. Issues to be discussed may include access to materials, signers or note-takers, the provision of services and additional exam and assessment arrangements. Early notification is essential to enable any necessary adjustments to be made.

If you believe that your performance in an assessable component of the course has been affected by illness or another unexpected circumstance, you should make an application for special consideration as soon as possible after the event by visiting UNSW Student Central. Please talk to the course coordinator as well and note that considerations are not granted automatically.

UNSW has strict policies and expectations relating to Occupational Health and Safety (OHS) accessed at http://www.ohs.unsw.edu.au/

Course Evaluation and Development

Student feedback has helped to shape and develop this course, including feedback obtained from on-line evaluations as part of UNSW's Course and Teaching Evaluation and Improvement (MyExperience) process. To discourage cheating and encourage independent problem-solving skills, we have increased the percentage of assessment contributed by the final exam.

Submission of Assessment Tasks

Laboratory reports and major assignments will require a Non Plagiarism Declaration Cover Sheet.

Assignments should be submitted on time. A daily penalty of 5% of the marks available for that assignment will apply for work received after the due date. Any assignment more than 5 days late will not be accepted. The only exemption will be when prior permission for late submission has been granted by the Course coordinator. Extensions will be granted only on medical or compassionate grounds under extreme circumstances.

Academic Honesty and Plagiarism

PLAGIARISM

Beware! An assignment that includes plagiarised material will receive a 0% Fail, and students who plagiarise may fail the course. Students who plagiarise will have their names entered on a plagiarism register and will be liable to disciplinary action, including exclusion from enrolment.

It is expected that all students must at all times submit their own work for assessment. Submitting the work or ideas of someone else without clearly acknowledging the source of borrowed material or ideas is plagiarism.

All assessments which you hand in must have a Non Plagiarism Declaration Cover Sheet. This is for

pa ‰ e e › //0 ’ ‰ ‰ ‰ liable to disc7 7 ‰ ‰ǂ ‰ ‰

Academic Information

COURSE EVALUATION AND DEVELOPMENT

Appendix: Engineers Australia (EA) Professional Engineer Competency Standard

Program Intended Learning Outcomes	
Knowledge and skill base	P
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	