GSOE9011

Engineering Postgraduate Coursework Research Skills

Term 1, 2022

Course Overview

Staff Contact Details

Convenors

Name	Email	Availability	Location	Phone
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School Contact Information

Faculty of Engineering

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Course Details

Units of Credit 6

Summary of the Course

This course is a distance version of the face-to-face delivery GSOE9010 course and is designed to develop research and communication skills and strategies that would support research aspects of the students' masters program. The course will take a flipped classroom approach with topics covered including

- Literature search
- Group dynamics
- Literature review
- Research proposal and grants
- Academic integrity
- Experimental design
- Research career and research profile
- Presenting and video pitch

Students will contribute to online discussions, lead discussion activities, participate in lecture discussions, take on-line quizzes. Students will write a written report on a proposal for a potential novel project in the topic area. This proposal should be written like a grant application, based on ARC guidelines. Aditionally, the students will also design their own CV to meet the criteria of an advertised job position of their interest.

Course Aims

1. Develop students' skills in locating and critically evaluating the literature that relates to their research project.
2. Inform students about engineering research methods.
3. Raise awareness of the interpersonal skills relevant to project management and collaborative research.
4. Develop students' understanding and skills in communicating in a variety of genres.
5. Provide students with strategies for constructively giving and responding to feedback.

Course Learning Outcomes

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

Learning Outcome	EA Stage 1 Competencies
1. formulate a research problem/question in engineering	PE1.4
2. conduct effective literature searches	PE1.3, PE3.4
3. design a solution to a research problem	PE2.3
4. design experiments to test the effectiveness of a solution	PE2.1

Learning Outcome	EA Stage 1 Competencies
5. consider collection and analysis of experimental results and the formulation of valid conclusions	PE2.2
6. communicate research proposals effectively, in oral and written modes	PE3.2
7. work effectively in a research team	PE3.6
8. develop a preliminary research profile and design an effective resume	PE3.5
9. practice research ethically	PE3.1

Teaching Strategies

GSOE9011 employs student-centred learning as the basis for its instructional design and emphasises the importance of active learning. The teaching in this course is based on a flipped-classroom philosophy conducted in an online or distance mode.

Student-centred activities form the basis of the course, which will draw on the diversity of the student cohort, including prior educational, professional or general knowledge of the students, and allow engagement in relevant and challenging experiences. The classes are designed to be supportive and friendly, and include meaningful realistic learning and assessment tasks, as well as promote independent and collaborative study and enquiry.

Teaching strategies used during the course will include:

- small group learning, and team-based assessment tasks, to further drive understanding of the importance of teamwork in an engineering context, to demonstrate the use of appropriate collaboration to address research goals, in an increasingly global professional environment;
- explicit teaching/instruction, through a range of teaching materials and approaches, including videos, live Q&A with subject matter experts and a range of teaching strategies to foster interest and support learning;
- structured occasions and environments, for reflection on learning, to allow students to reflect critically on topics discussed, and;
- extensive opportunities for whole group and small group dialogue and discussion, allowing students the opportunity to demonstrate their capacity to communicate.

These activities will occur in a climate that is, as much as possible, supportive and inclusive of all learners. **It is critical that all students engage with the inherent diversity of the cohort**, recognising the need to give and take through the teaching and learning process, reflective of the diversity encountered in the modern workplace.

Assessment

Assessment task	Weight	Due Date	Course Learning Outcomes Assessed
1. Contributions to Online Forum Discussions	10%	Not Applicable	3
2. On-line Quizzes	10%	Not Applicable	1, 2, 3, 4, 5, 6, 7, 8, 9
3. CV Development	15%	01/04/2022 11:59 PM	8
4. Research Proposal	55%	29/04/2022 11:59 PM	1, 2, 3, 4, 5, 6, 7, 9
5. Video presentation	10%	06/05/2022 11:59 PM	6

Assessment 1: Contributions to Online Forum Discussions

Students are expected to make at least one *reasonable* contribution to the communication channels for each Course Topic; this is through the Moodle forum for that Topic, either for (prior to) the Q&A session, after the Q&A session, or through questions or comments during the Q&A session itself. For assessment, these contributions must be made during the four-week window flagged above in the schedule. Forums will remain open until the end of Term, if anyone wishes to make further contributions

Assessment criteria

Contributions to forums are worth 10% of your final course grade. This will be based on making, ideally, at least one reasonable contribution to the forum (or the Live Session itself) for each Course Topic. It is hoped that, through engagement with the course material, staff and students and your own curiosity, you will find it easy to make more (perhaps many more) than one contribution to at least some of the Forums – this has been seen with a number of students. So, what is *reasonable*? Note the above descriptions. If you really have any doubt, you may wish to check in with the Course Coordinator during Topic 1. As you are graduate students, I would expect a high degree of self-efficacy here, and that you would have your own sense of what is reasonable; guiding concepts have been included above.

Assessment 2: On-line Quizzes

Students will complete a quiz for each topic; the quiz contains randomly selected multiple-choice questions related to the learning materials. The quizzes are designed to encourage you to stay up to date with the course. The relevant quiz will remain open for two weeks after completion of the course topic (a four-week window), to allow you flexibility in completion. You are permitted unlimited attempts, but you must score 100% on each quiz, to complete that quiz and earn full marks for it.

Assessment criteria

There are eight (8) quizzes, each with a value of 10 marks. If you don't get all the answers correct in the quiz, you are allowed unlimited attempts to gain maximum marks. Thus, if you persist with completion, you will receive 10% toward your course mark (80 ¸ 8). This assessment item has been configured this way, as it is about driving your engagement with and understanding of the content, and thus providing increased benefit for engagement in the live Q&A session and the relevant Course Topic Forum. **NOTE: You are expected to engage actively with the course content for your work with the Quizzes to be**

considered meaningful; you may lose marks for this assessment task if there is evidence that you have not engaged with the course content.

Assessment 3: CV Development

Start date: 28/02/2022 12:00 AM
Assessment length: 2 pages
Due date: 01/04/2022 11:59 PM

Each student will prepare and submit a CV. Further detail of this assessment task is provided in a separate document in Moodle.

This is not a Turnitin assignment

Assessment criteria

The following marking rubric has been compiled based on several published rubrics to assess CVs and aligns with the guidelines provided by UNSW Careers and Employment. The CV is not assessed on the level of professional experience held by the student, but by the format and content of the CV assessed using the rubric below.

Assessment 4: Research Proposal

Start date: 14/02/2022 08:00 AM
Due date: 29/04/2022 11:59 PM

The Research Proposal is the main assessment task in the course. To complete this assignment, you will be assigned to a *team* of 4 to 6 students, no more or less, at least to begin with. Each team will submit three deliverables:

1. Research Question: Teams submit their draft research question and the Engineering Research Challenge their topic best matches. (formative/summative)
2. Draft Research Proposal: encompassing the literature review and certain other sections. (formative/summative)
3. [Peer review of draft proposal]
4. Final Research Proposal: covering all sections including the methodology and schedule. (25 marks)
5. [Peer review of team members]

Submission of (b) will include peer review of the draft research proposal submission (c), and submission of (d) will include an anonymous teamwork evaluation (e).

Peer review is an important part of research and general professional practice, as well as an active learning process. Students will individually evaluate the (b) draft research proposals of their peers, just as happens with real research projects. You will also evaluate the performance of your team members in completing the Final Research Proposal task. Marks will be awarded to you for provision of fair and constructively critical reviews. Penalties may be imposed for poor performance in teamwork, based on

peer evaluation.

Further detail of this assessment task and its components is provided in a separate document in Moodle.

Assessment criteria

Marking rubrics for the various parts of this assessment are given on the following pages. Note that these are provided as a guide to criteria and standards that help you produce an appropriate piece of work. Marking takes these to consideration and they are applied, but typically a rich assessment task is marked holistically and with qualitative feedback, while taking all criteria into account. Typically it is not atomistic and not a simple sum of marks for parts.

Marking rubric for Research Question

Criteria (and weighting)	Description	Marking
Question (10%)	Is the Research Question actually posed in the form of a question?	No (0) Yes (0.5)
Scope (10%)	Can the Research Question be answered reasonably through a 12-month industry or university research project?	No (0) Yes (0.5)
Gap (40%)	Does the Research Question target a gap or gaps in our knowledge of the topic that can't simply be answered by retrieving existing data?	Unsatisfactory (0) Satisfactory (1) Outstanding (2)
Hypothesis (40%)	Does the Research Question require the development and testing of theories that can predict or explain natural phenomena or the performance of systems?	Unsatisfactory (0) Satisfactory (1) Outstanding (2)

Assessment 5: Video presentation

Start date: 11/04/2022 08:00 AM
Due date: 06/05/2022 11:59 PM

Each student will submit a 3-minute video presentation (an 'elevator' pitch), based on their team's research proposal.

Further detail of this assessment task is provided in a separate document in Moodle.

This is not a Turnitin assignment

Assessment criteria

Attendance Requirements

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

Resources

Prescribed Resources

All learning materials are online in Moodle.

Submission of Assessment Tasks

Work submitted late without an approved extension by the course coordinator or delegated authority is subject to a late penalty of five percent (5%) of the maximum mark possible for that assessment item, per calendar day.

The late penalty is applied per calendar day (including weekends and public holidays) that the assessment is overdue. There is no pro-rata of the late penalty for submissions made part way through a day. This is for all assessments where a penalty applies.

Work submitted after five days (120 hours) will not be accepted and a mark of zero will be awarded for that assessment item.

For some assessment items, a late penalty may not be appropriate. These will be clearly indicated in the course outline, and such assessments will receive a mark of zero if not completed by the specified date. Examples include:

- Weekly online tests or laboratory work worth a small proportion of the subject mark, or
- Online quizzes where answers are released to students on completion, or Professional assessment tasks, where the intention is to create an authentic assessment that has an absolute submission date, or Pass/Fail assessment tasks.

Academic Honesty and Plagiarism

UNSW has an ongoing commitment to fostering a culture of learning informed by academic integrity. All UNSW students have a responsibility to adhere to this principle of academic integrity. Plagiarism undermines academic integrity and is not tolerated at UNSW. *Plagiarism at UNSW is defined as using the words or ideas of others and passing them off as your own.*

Plagiarism is a type of intellectual theft. It can take many forms, from deliberate cheating to accidentally copying from a source without acknowledgement. UNSW has produced a website with a wealth of resources to support students to understand and avoid plagiarism, visit: student.unsw.edu.au/plagiarism. The Learning Centre assists students with understanding academic integrity and how not to plagiarise. They also hold workshops and can help students one-on-one.

You are also reminded that careful time management is an important part of study and one of the identified causes of plagiarism is poor time management. Students should allow sufficient time for research, drafting and the proper referencing of sources in preparing all assessment tasks.

Repeated plagiarism (even in first year), plagiarism after first year, or serious instances, may also be investigated under the Student Misconduct Procedures. The penalties under the procedures can include a reduction in marks, failing a course or for the most serious matters (like plagiarism in an honours thesis or contract cheating) even suspension from the university. The Student Misconduct Procedures are available here:

www.gs.unsw.edu.au/policy/documents/studentmisconductprocedures.pdf

I. Special consideration and supplementary assessment

If you have experienced an illness or misadventure beyond your control that will interfere with your assessment performance, you are eligible to apply for Special Consideration prior to submitting an assessment or sitting an exam.

Please note that UNSW now has a Fit to Sit / Submit rule, which means that if you sit an exam or submit a piece of assessment, you are declaring yourself fit enough to do so and cannot later apply for Special Consideration.

For details of applying for Special Consideration and conditions for the award of supplementary assessment, please see the information on UNSW's Special Consideration page.

II. Administrative matters and links

All students are expected to read and be familiar with UNSW guidelines and polices. In particular, students should be familiar with the following:

- Attendance
- UNSW Email Address
- Special Consideration
- Exams
- Approved Calculators
- Academic Honesty and Plagiarism
- Equitable Learning Services

III. Equity and diversity

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 convener prior to, or at the commencement of, their course,or with the Equity Officer (Disability) in the Equitable Learning 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.

Image Credit

MCIC, Division of Enterprise, UNSW.

CRICOS

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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	✓