UNSW AUSTRALIA

Never Stand Still | Engineering | Mechanical and Manufacturing Engineering

ENGG1200:
NAE Grand Challenges for Engineering

Contents

1. Contact Staff

1.1 Contact details and consultation times for course convenor

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1.2 Contact details and consultation times for demonstrators

UNSW Demonstrator: TBD

2. Course Details

2.1 Credit points

This is a 6 unit-of-credit (UoC) course, which involves <*4*> hours per week (h/w) of face-to-face contact. The UNSW website states "The normal workload expectations of a student are approximately 25 hours per semester for each UoC, including class contact hours, other learning activities, preparation and time spent on all assessable work. You should aim to spend about 12 h/w on this course. The additional time should be spent in making sure that you understand the lecture material, completing the set assignments, further reading, and revising for any examinations.

2.2 Contact hours

	Day	Time	Location	Week
Weekly Lectures	Tuesday	09:00 – 10:30	K17 Room 103	1-6
	Thursday	09:00 – 10:30	K17 Room 103	1-6
	Tuesday	08:00 – 09:30	K17 Room 103	7-15
	Thursday	08:00 – 09:30	K17 Room 103	7-15

2.3 Course summary

This course, centered on the theme of National Academy of Engineering's (NAE) Grand Challenges for Engineering in the 21st century, will offer a unique opportunity for students to develop an interdisciplinary appreciation for the Grand Challenges that can be addressed by engineers. This course will increase students' awareness of the social complexities of meeting the needs of local and global challenges through engineering and technology.

Students will also learn more about the Grand Challenge Scholars program, begin their path towards making a Grand Challenge area their life's passion.

In this course, students from Arizona State University (ASU) and University of New South Wales (UNSW), will attend class simultaneously and learn together interactively through in-class discussions and activities based on the use of video conferencing technologies. Students in the course will also continue to work collaboratively in small teams across physical, institutional, and cultural boundaries outside of class time.

2.4 Learning outcomes

This course is designed to address the learning outcomes below and the corresponding Engineers Australia Stage 1 Competency Standards for Professional Engineers as shown. The full list of Stage 1 Competency Standards may be found in Appendix A. After successfully completing this course, you should be able to:

Learning Outcomes	EA Stage 1 Competencies
Develop an interdisciplinary understanding of the global engineering Grand Challenges that human societies face in the 21st century	PE1.1
Describe the research themes at UNSW, and locate ongoing research at in all Grand Challenge theme areas.	PE 1.5
Identify opportunities to create added value in the Grand Challenge areas, and conceptualize a potential future solution.	PE 1.6
Interpret why (and in what ways) a technology/design solution adds value from multiple perspectives (technological, sociocultural, economic, environmental, global, etc.), and describe a design solution in terms of its societal value (and its technical features and function).	PE1.1
Demonstrate an awareness of societal issues (e.g. sociocultural, political, economic, and environmental) that influence and/or constrain engineering solutions.	PE 3.3
Create a preliminary plan of study for completing the five components (research, interdisciplinary, entrepreneurship, global, service learning) of the GC Scholars Program during their undergraduate career.	PE3.1 and 3.2

3. Teaching Strategies

Weekly lectures are the primary teaching and learning activities for this course. All/most of the in-class lectures (except guest lectures) will be interactive discussions & activities (i.e. active learning sessions) with minor lecture components, rather than a typical 'lecture'. There will often be materials for students to review/read before coming to class. The weekly lectures will be led by the ASU instructor. In addition, some global experts for different GC themes will be invited to deliver guest lectures. The importance of lectures cannot be overstated. Unless otherwise approved, you are required to participate in every lecture and pay 100% of your attentions in class.

The best way to understand those Grand Challenges for Engineering is through practicing on a specific project, together with other engineers. Two kinds of cohorts will be formed for this class: project team and cultural group. For the former, the UNSW students will collaborate with their counterparts at ASU to jointly accomplish a team project to identify a particular GC and propose a preliminary Future Solutions. For the latter, the UNSW students

will collaborate with each other to accomplish a cross-cultural activity, which is intended to explore the profound impacts of diversified cultural perspectives on the understanding of Grand Challenges for Engineering.

4. Course Schedule

Week	Dates	Topic	**Assignments Due** (before 1st class of week, unless otherwise specified)
1	2/28, 3/02	Identify Interests: Specific Opportunities/Challenges; Team Formation – Begin Project	
2	3/07, 3/09	**ASU: SPRING BREAK (NO CLASSES)** (Functional Design concepts for UNSW students)	
3	3/14, 3/16	FS Project Work Day (Needs Analysis); GC-related guest lecture	
4	3/21, 3/23	FS Project Work Day (Solution Development); GC-related guest lecture	Project Needs Analysis
6	3/28, 3/30	Cross-Cultural Activity	Cross-cultural activity
7	4/04, 4/06	FS Social Factors (ASU guest-led activity); Poster/Presentation Tips	Project Solution Development
8	4/11, 4/13	GC-related guest lectures	Poster (due to BB for review 4/13)
9	4/18, 4/20	**UNSW: Teaching Recess (NO CLASSES)**	Project Poster Due
10	4/25, 4/27	Team Project Presentations	Final Portfolio Entry (4/30)
11	5/02, 5/04	Activities/Discussions: GC Theme 1, GC Theme 2 (attended by only UNSW students)	
12	5/09, 5/11	GC-related guest lectures (attended by only UNSW students)	
13	5/16, 5/18	Activities/Discussions: GC Theme 3, GC Theme 4 (attended by only UNSW students)	
14	5/23, 5/25	GC-related guest lectures (attended by only UNSW students)	Grand Challenge Research Paper
15	5/30, 6/01	Student research sharing (attended by only UNSW students)	GC Research Presentation

The lecturer reserves the right to adjust the above schedule based on learning progression.

5. Assessment Scheme

Participation and teamwork are critical to your success in this course. There will be no exams in this course; performance will be assessed based on class participations, a digital Portfolio, a research paper and presentation, a cross-cultural activity, and a team project. Assignment categories are briefly described below and additional materials that specifically outline the requirements for each assignment will be provided in class and/or on Blackboard.

Individual Assignments: ***Participation*** will include attendance to lectures, completing necessary preparation for in-class discussions and activities, and contributing during in-class sessions. You will maintain a ***digital portfolio*** of this course to record and reflect on the in-class experiences and your interests in the grand challenges throughout the course. Outside of class, you will be asked to individually do further research to explore your specific interests in the Grand Challenges and report on your findings by means of a ***research paper*** and an ***individual presentation.***

Team Assignments: The ***cross-cultural activity*** is a unique opportunity to explore the cultural diversity present in this multi-institutional course. This cross-cultural activity will require an assignment completed by a team of students at a single university, followed by interaction between all students during class. The ***Future Solutions project*** will require cross-campus student teams to work together, primarily outside of class, to complete a team project focused on developing a Future Solution to a specific problem related to one (or more) of the Grand Challenge areas.

There will be a total of 100 points available in this class. Every point is worth the same, but different assignments will have different point values. The table below provides details on how your performance will be assessed in this course and the points available for each category of assignments.

Task	**Contribution**	**Mark**	**Learning Outcome**	**Due**	**Marks Returned**
Participation/Contribution to in-class discussions	*Individual*	*5%*	*1, 6*	*Due every week*	*1 week after each lecture*
Digital Portfolio (setup + 5 entries)	*Individual*	*25%*	*2, 3, 4, and 5*	*Week 6, 7, 8, 9, 10*	*Two weeks after submission*
Grand Challenge Research Presentation	*Individual*	*15%*	*1,2, and 6*	*Week 15*	*Upon release of final mark*
Grand Challenge Research Paper	*Individual*	*15%*	*1, 2, and 6*	*Week 14*	*Upon release of final mark*
Cross-Cultural Activity	*Team*	*10%*	*4 and 5*	*Week 6*	*Two weeks after submission*
Future Solution Project	*Team*	*30%*	*2, 3, 4, and 5*	*Week 10*	*Two weeks after submission*

Individual project grades will be based on both the team's grade and the individual's contribution to the team. At the conclusion of the course, a confidential peer evaluation will be conducted in order to evaluate the teamwork dimension of the design project. Each student will be asked to fill out a questionnaire, which evaluates every team member for his/her contribution to teamwork in different categories. The evaluations are averaged in order to find each student's contribution and the weighting factor is made proportional to the average. The peer evaluation result is intended to reward the active contributors and penalize the inactive ones.

All assignments must be turned in before the deadline stated on Blackboard and/or in class. An extension may only be granted in exceptional circumstances. Where an assessment task is worth less than 20% of the total course mark and you have a compelling reason for being

unable to submit your work on time, you must seek approval for an extension from the course convenor ***before the due date***. Special consideration for assessment tasks of 20% or greater must be processed through student.unsw.edu.au/special-consideration. On the other hand, it is always worth submitting late assessment tasks when possible. Completion of the work, even late, may be taken into account in cases of special consideration.

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

6. Expected Resources

There is no required textbook for this course. Selected readings will be provided from various sources each week and will be available on Blackboard. All materials, assignment details, and due dates will be available on Blackboard (the learning management system used in ASU, which is similar to Moodle). All UNSW students will be provided with a guest access to Blackboard. You will be expected to use Google Doc to complete Portfolio entries throughout the semester. You are expected to check Blackboard regularly. NOTE: Other online resources may be used to distribute course materials. Instructors will inform you about those resources in class, in Blackboard, and/or via email when they are identified.

7. Course Evaluation and Development

Feedback on the course is gathered periodically using various means, including the Course and Teaching Evaluation and Improvement (CATEI) process, an informal discussion in the final class for the course, and the School's Student/Staff meetings. Your feedback is taken seriously, and continual improvements are made to the course based on such feedback.

8. Classroom Policy

Students are expected to conduct themselves professionally in class. Any behavior that might cause hindrance to the progress of the class is not acceptable. Students are requested to refrain from using pagers, cell phones, or laptops during class (except for note taking or other class related purposes) so as not to disturb the other students. You should not be texting, surfing the web, or doing other non-class related activities on your computer, tablet, or cell phone during the lecture time. Students are allowed to use recording devices, but the commercial distribution of the recordings is not permitted.

9. 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 acknowledgment. UNSW has produced a website with a wealth of resources to support students to understand and avoid plagiarism: 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.

If plagiarism is found in your work when you are in the first year, your lecturer will offer you assistance to improve your academic skills. They may ask you to look at some online resources, attend the Learning Centre, or sometimes resubmit your work with the problem fixed. However more serious instances in the first year, such as stealing another student's work or paying someone to do your work, may be investigated under the Student Misconduct Procedures.

Repeated plagiarism (even in the first year), plagiarism after the 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) even suspension from the university. The Student Misconduct Procedures are available here:
www.gs.unsw.edu.au/policy/documents/studentmisconductprocedures.pdf

Further information on School policy and procedures in the event of plagiarism is available on the intranet.

10. Administrative Matters

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

- Attendance, Participation and Class Etiquette
- UNSW Email Address
- Computing Facilities
- Assessment Matters
- Academic Honesty and Plagiarism
- Student Equity and Disabilities Unit
- Health and Safety
- Student Support Services

II. Appendix A: Engineers Australia (EA) Stage 1 Competencies for Professional Engineers

	Program Intended Learning Outcomes
PE1: Knowledge and Skill Base	PE1.1 Comprehensive, theory-based understanding of underpinning fundamentals
	PE1.2 Conceptual understanding of underpinning maths, analysis, statistics, computing
	PE1.3 In-depth understanding of specialist bodies of knowledge
	PE1.4 Discernment of knowledge development and research directions
	PE1.5 Knowledge of engineering design practice
	PE1.6 Understanding of scope, principles, norms, accountabilities of sustainable engineering practice
PE2: Engineering Application Ability	PE2.1 Application of established engineering methods to complex 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
PE3: Professional and Personal Attributes	PE3.1 Ethical conduct and professional accountability
	PE3.2 Effective oral and written communication (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