School of Civil and Environmental Engineering

Term 3, 2021

ENGG4102 HUMANITARIAN ENGINEERING PROJECT

COURSE DETAILS

Units of Credit	6
Contact hours	3 contact hours per week (2 Lecture, 1 Seminar): • Monday Lectures 10:00-11:00 and 12:00 – 13:00 • Tuesday Seminar 14:00 – 15:00
Class location	Online, Blackboard Ultra
Course Coordinator and Lecturer	Dr Andrew Dansie email: a.dansie@unsw.edu.au office: CE306 phone: arrange to call on Microsoft Teams during COVID-19 remote teaching

INFORMATION ABOUT THE COURSE

This course provides students the opportunity to undertake a design project related to Humanitarian Engineering. This includes partnering with a real world partner external partner and students will represent UNSW Engineering in engagement and collaborative work with these project partners. When travel is allowed, further engagement may include an optional field work component if appropriate which would provide students with further context and skills in humanitarian engineering but is not part of this course UoC or requirements. The course will be problem based, with context aligned with clearly identified needs for a marginalised community, either locally or internationally.

The course is intended to be predominantly team-based, with groups working on humanitarian related challenges, as approved by the course coordinator. Examples may be projects related to ongoing faculty research projects e.g. PLuS alliance, Social Impact projects or other collaborations between UNSW Faculty of Engineering and appropriate community partners.

Projects could include any or all of the following components as appropriate to the identified problem:

- background review of needs, context
- development of potential solutions, including review of existing data, research and technologies as appropriate
- evaluation of solutions
- economic
- social
- environmental
- technical
- possible prototyping and/or lab investigations and/or field work
- implementation strategy including involvement of the local community and consideration of long term sustainability.

Students will be encouraged to undertake community consultation e.g. via interviews or surveys or similar

research to assist in the evaluation of solutions. The course is structured as independent project work with regularly scheduled meetings with an assigned academic advisor and/or industry mentor.

The assumed knowledge for this course is ENGG3001 or demonstrated previous experience in humanitarian engineering contexts through student activities or other interest.

The course forms a core component part of the optional 'Humanitarian Engineering Minor' and 'Humanitarian Science and Technology Minor' (https://www.challeng.unsw.edu.au/social-impact/humanitarian-engineering/study-humanitarian-engineering). Students who are interested in completing a Humanitarian Minor can speak with Dr. Dansie and/or your School Undergraduate Coordinator.

HANDBOOK DESCRIPTION

See link to virtual handbook*:*

https://www.handbook.unsw.edu.au/undergraduate/courses/2021/ENGG4102

OBJECTIVES

This course enables engineers to undertake a project to contribute towards solving a specific challenge faced by individuals and communities in marginalised circumstances that is affecting their well-being and welfare. The objectives of the course are to develop students who:

- are aware of challenges impacting communities on a global scale
- have the skills required to make meaningful contributions to disadvantaged and marginalised communities
- can apply engineering discipline knowledge in new and challenging contexts.

These objectives link to the following program outcomes:

- An in-depth engagement with the relevant disciplinary knowledge in its inter-disciplinary context
- Capacity for analytical and critical thinking and for creative problem solving
- Ability to engage independent and reflective learning
- Information literacy
- Skills for effective communication
- Ethical conduct and professional accountability
- Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice
- Effective team membership and team leadership

TEACHING STRATEGIES

The Humanitarian Engineering project is a group project in which each student works under the guidance of a nominated member of the Faculty's academic staff (supervisor). Mentors (including from industry) may also be nominated depending on the set up of the project. The focus will be on design and research skills, collaboration within groups and/or external partners (including community and/or industry).

Supervisors will work with groups to define scope of problem, brainstorm solutions for problems as they arise, provide feedback on progress and suggestions for contacts for information, directions to try or new methods.

The following teaching strategies will be used in the course:

Private Study/ Group work	• As a rough guide students are expected to spend approximately 10 hours per week on work related to the course • Team meetings • Undertake research, design, field trials

	• Complete reflective journal • Prepare assessment tasks
Meetings with supervisor	• Discuss progress and plan tasks • Brainstorm problem faced and possible solutions • Discuss useful contacts or sources of information • Review journal
Assessments	• Demonstrate your knowledge and skills • Demonstrate higher understanding and problem solving

EXPECTED 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 Outcome		**EA Stage 1 Competencies**
1.	*Critically analyse engineering problems in new and challenging contexts and develop creative solutions applying engineering discipline knowledge*	*PE1.3, PE1.4, PE1.5*
2.	*Apply appropriate technology and engineering system design principles to humanitarian engineering contexts incorporating social, economic and environmental factors*	*PE1.6, PE2.2*
3.	*Apply systematic engineering approaches to the management of an engineering project*	*PE2.4*
4.	*Develop effective communication and collaboration skills in the context of cross-cultural community and multi-disciplinary work.*	*PE3.2, P3.4, PE3.6*
5.	*Show respect for ethical practice and social responsibility.*	*PE3.1*
6.	*Demonstrate the ability to engage in independent and reflective learning*	*PE3.3, PE3.5*

ASSESSMENT

The assessment tasks for this course have been developed to assess each student's achievements in terms of each of the six learning outcomes listed above.

Assignments are group and individual assessments to assess the students' understanding of the concepts in agreement with the learning objectives.

The final course mark will be based on you completing the coursework as per the table below.

Students who perform poorly in the assignments are recommended to discuss progress with the lecturer during the term. Note: The lecturer reserves the right to adjust the final scores by scaling if agreed by the Head of School.

Assessment Task	**Assessment Details**	**Due Date**
Project journal (5% +10%)	Weekly journal documenting learning and observations, meeting minutes and personal reflections.	Preliminary submission Friday Week 3 Final Submission Friday Week 11
Presentation (25%)	Mid term project progress (individual mark)	Week 7 (time and day to be agreed)
Project report (45%)	Prepared as a group reporting the findings from the project	Friday (Week 10)

Interview (15%)	Peer and academic assessment of participation, management, interactions with industry and community	Week 10 at time to be agreed with supervisor

Late work will be penalised at the rate of 10% per day after the due time and date have expired. The penalisation will be calculated as 10% from the graded mark of the submitted work.

COURSE PROGRAM

The course schedule provides a guide for how each project will proceed.

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Week	Suggested activities	Lecture Content	Assessments and notes
1	Meet your group; arrange regular meeting times with supervisor, draft project plan.	Introduction to course content, finalise groups and topics (1 hour lecture)	
2	Finalise project plan and group roles.		
3	Desktop review and project work. Submit your preliminary reflective journal.		Assessment: Preliminary weekly reflective journal.
4	Desktop review, external partner consultation and project work.		
5	Commence any construction or prototyping activities and project work.		
6	External partner consultation, finalise presentation based on preliminary research and plan for final submissions.	*No classes in Week 6*	
7	Gather feedback from presentation. Continue with project.	Team presentations (During timetabled lecture/seminar slot)	Assessment: Presentation, midway progress assessment
8	Complete final project stages and draft report.		
9	Prepare for interviews, seek feedback on report drafts	Finalise course, general feedback and project management interviews	Assessment: Interview
10	Finish and submit group report. Complete project management interview with supervisor.		Assessment: Group Report Due
11			Assessment: Final version reflective project journal.

ASSESSMENT OVERVIEW

Item	Weighting	Learning outcomes assessed	Assessment Criteria	Due date	Deadline for absolute fail	Marks returned
Project journal and reflection (Part 1)	5%	1, 5,6	Students are required to keep a weekly journal documenting learning and observations, meeting minutes and personal reflections. This will be checked by the academic advisor on a weekly basis.	Friday Week 3	Friday Week 4	Friday Week 4
Project journal and reflection (Part 2)	10%	1,2,5,6	The remainder of the journal will be assessed along with a final essay on the student's reflections on development perspectives and project outcomes.	Friday Week 11	Friday Week 12	Friday Week 13
Presentation	25%	1,4	Presentations will be assessed on content and communication style including project progress to date, clear plans for remainder of the project and clear and persuasive presentation style	Week 7	N/A	Week 8
Project report	45%	1,2,3,4,5,6	The report will be assessed based on the thoroughness of the project design and research, professional report standard and demonstration of a community centred approach.	Friday Week 10	Friday Week 11	Friday Week 12
Project Interview	15%	3,4,5,6	Mock interview based on ENGG4102 project with academic advisor and interview panel. Demonstration of clear project management skills, sustained involvement during term and reflective learning on humanitarian engineering.	Week 9 – Day/time TBD with interview panel	N/A	Friday Week 12

RELEVANT RESOURCES

There is no textbook for this course and recommended references will be provided on Moodle.

DATES TO NOTE

Refer to MyUNSW for Important Dates available at:

https://my.unsw.edu.au/student/resources/KeyDates.html

PLAGIARISM

Beware! An assignment that includes plagiarised material will receive a 0% Fail, and students who plagiarise may fail the course. Students who plagiarise are also liable to disciplinary action, including exclusion from enrolment.

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

(Formerly known as Common School Information)

For information about:

- Notes on assessments and plagiarism,
- School policy on Supplementary exams,
- Special Considerations: student.unsw.edu.au/special-consideration
- Solutions to Problems,
- Year Managers and Grievance Officer of Teaching and Learning Committee, and
- CEVSOC.

Refer to Academic Advice on the School website available at:

https://intranet.civeng.unsw.edu.au/key-staff-to-contact-during-your-studies-at-unsw

Appendix A: Engineers Australia (EA) Competencies

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