UNSW Course Outline

ENGG4102 Humanitarian Engineering Project - 2024

Published on the 30 Aug 2024

General Course Information

Course Code : ENGG4102
Year : 2024
Term : Term 3
Teaching Period : T3
Is a multi-term course? : No
Faculty : Faculty of Engineering
Academic Unit : School of Civil and Environmental Engineering
Delivery Mode : In Person
Delivery Format : Standard
Delivery Location : Kensington
Campus : Sydney
Study Level : Undergraduate
Units of Credit : 6

<u>Useful Links</u>

<u>Handbook</u> <u>Class Timetable</u>

Course Details & Outcomes

Course Description

This course provides students with the opportunity to undertake a design project related to Humanitarian Engineering. 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.

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.

Course Aims

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 course aims 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, and

Can apply engineering discipline knowledge in new and challenging contexts.

Relationship to Other Courses

ENGG3001 is a prequisiste. If you have gained relevant experience elsewhere contact the courtse

coordinator about having the prerequisite waived.

Course Learning Outcomes

Course Learning Outcomes
CLO1 : Critically analyse engineering problems in new and challenging contexts and develop creative solutions applying engineering discipline knowledge.
CLO2 : Apply appropriate technology and engineering system design principles to humanitarian engineering contexts incorporating social, economic and environmental factors.
CLO3 : Apply systematic engineering approaches to the management of an engineering project.
CLO4 : Communicate and collaborate effectively in the context of cross-cultural community and multi-disciplinary work.
CLO5 : Show respect for ethical practice and social responsibility.
CLO6 : Engage in independent and reflective learning.

Course Learning Outcomes	Assessment Item
CLO1 : Critically analyse engineering problems in new and challenging contexts and develop creative solutions applying engineering discipline knowledge.	• Project Interview • Project journal • Mid Project Presentation • Project report
CLO2 : Apply appropriate technology and engineering system design principles to humanitarian engineering contexts incorporating social, economic and environmental factors.	• Project Interview • Project report
CLO3 : Apply systematic engineering approaches to the management of an engineering project.	• Project report
CLO4 : Communicate and collaborate effectively in the context of cross-cultural community and multi-disciplinary work.	• Mid Project Presentation • Project report
CLO5 : Show respect for ethical practice and social responsibility.	• Project journal • Project Interview • Project report
CLO6 : Engage in independent and reflective learning.	• Project journal • Project Interview • Project report

Learning and Teaching Technologies

Moodle - Learning Management System

Learning and Teaching in this 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.

Assessments

Assessment Structure

Assessment Item	Weight	Relevant Dates
Project Interview Assessment Format: Individual	15%	Due Date: 05/11/2024 11:00 AM
Project journal Assessment Format: Individual	15%	Due Date: See assessment information.
Mid Project Presentation Assessment Format: Group	25%	Due Date: 22/10/2024 11:00 AM
Project report Assessment Format: Individual	45%	Due Date: 15/11/2024 05:00 PM

Assessment Details

Project Interview

Assessment Overview

Mock interview based on the project with an expert interview panel. Demonstration of clear project management skills, sustained involvement during term and reflective learning on humanitarian engineering. The interview is expected to take 15-20 minutes per person. This is an individual interview session and is not related to your assigned groups. A marking rubric will be provided. Feedback will be given during the interviews.

Course Learning Outcomes

- CLO1 : Critically analyse engineering problems in new and challenging contexts and develop creative solutions applying engineering discipline knowledge.
- CLO2 : Apply appropriate technology and engineering system design principles to humanitarian engineering contexts incorporating social, economic and environmental factors.
- CLO5 : Show respect for ethical practice and social responsibility.
- CLO6 : Engage in independent and reflective learning.

Detailed Assessment Description

One of the principles of effective humanitarian engineering is to demonstrate engagement and professional practice. Professional practice in many circumstances goes beyond displaying competency and may include factors pertaining to cultural understanding, ethical considerations,

resiliency, and engagement. Within your career as a Humanitarian Engineer, demonstrating engagement with these factors in mind can make the difference between a successful and unsuccessful project.

In this assessment, you will be role playing as an applicant for a humanitarian engineer position for a very similar project to, but not the same as, your ENGG4102 project. This position is valuable to you, and you will be required to attend an interview to present your qualities and perceptions of humanitarian engineering. This will consist of your providing answers to targeted questions during the interview, and then presenting yourself in a short time frame (3 minutes) to define both your strengths and weaknesses as an engineer.

Your interview will be centred around the following themes (not exhaustive):

- Your project's description, and your contribution to that project
- Your own identified strengths and weaknesses as a humanitarian engineer, and an understanding of how best to use your abilities
- An understanding of the approach needed for the new project and the need of the in-country partner - interactivity with local community and government, research approaches and so on

Identification of potential humanitarian issues in the region

Assessment information

Individual time slots for your interviews will be arranged during your term, to be in either the exisiting Lecture of Seminar timetabling slot.

Assignment submission Turnitin type

This assignment is submitted through Turnitin and students do not see Turnitin similarity reports.

Generative AI Permission Level

No Assistance

This assessment is designed for you to complete without the use of any generative AI. You are not permitted to use any generative AI tools, software or service to search for or generate information or answers.

For more information on Generative AI and permitted use please see here.

Project journal

<u>Assessment Overview</u>

Weekly journal documenting learning and observations, meeting minutes and personal reflections. A marking rubric will be provided. Marks will be returned the following week.

<u>Course Learning Outcomes</u>

- CLO1 : Critically analyse engineering problems in new and challenging contexts and develop creative solutions applying engineering discipline knowledge.
- CLO5 : Show respect for ethical practice and social responsibility.
- CLO6 : Engage in independent and reflective learning.

<u>Detailed Assessment Description</u>

In humanitarian engineering contexts, it is important to thoroughly consider a broad range of potential impacts of any proposed solutions to the community of interest. The aim of collecting this journal is to capture and consider your aims and learning from the humanitarian engineering course. This assessment is divided into two parts, part 1 due at the beginning of term and part 2 due at the end.

The reflection journal should document how your knowledge of humanitarian engineering develops during the course of the project. The journal should document:

- preliminary personal goals for the course,
- personal reflections (up to the submission date),
- learning and observations related to the project, noting their evolution
- meeting minutes and/or summaries of meeting outcomes.

When considering the split between these four topics, you should prioritise the documentation of your personal goals and reflections. Observations and meeting minutes will likely be similar across the group but should be organised and documented as you go to track progress.

Your personal reflections should consider at least some of the following topics (not exhaustive):

- What you personally aim to get out of the ENGG4102 course,
- The role of humanitarian engineers,
- How the context of your current project influences your learning and thoughts
- The difference, if any, between other engineering projects and humanitarian engineering contexts,
- Underlying assumptions you make during your project. For example, are you making any explicit or implicit assumptions about engineering or humanitarian work?
- Commentary and cross referencing to any learning material (journal or newspaper articles) that has changed or challenged your perspective along the way and how it did so.

- Relevance or application of your project to world events occurring during your project timeline

See Reflective Writing guidance and information at https://student.unsw.edu.au/reflective-writing

<u>Assessment information</u>

Part 1 of this assessment is due Week 3 at and is worth 5% of your total individual course marks. Part 2 (final journal) is due Week 11 and is worth 10% of your total individual course marks. Late submissions will lose 5% of final graded mark per day late. **One individual personal reflection journal is required from each team member**. The journal should be submitted as a word document through the assignment tool in Moodle. A rubric, which you will see at the end of this assessment brief and on the Moodle submission page, will be used to assess the work. Comments and feedback will be provided as tracked changes and/or through the Moodle submission interface.

<u>Assignment submission Turnitin type</u>

This assignment is submitted through Turnitin and students do not see Turnitin similarity reports.

<u>Generative AI Permission Level</u>

No Assistance

This assessment is designed for you to complete without the use of any generative AI. You are not permitted to use any generative AI tools, software or service to search for or generate information or answers.

For more information on Generative AI and permitted use please see here.

Mid Project Presentation

<u>Assessment Overview</u>

The project presentation is designed to provide students with the opportunity to get feedback on their ideas, research and progress so far to strengthen the final outcomes of your project. The presentation is made as a group, but marks are assigned individually. Each student within the group should present for 10 minutes. A marking rubric will be provided and marks will be returned in 2 weeks.

<u>Course Learning Outcomes</u>

- CLO1 : Critically analyse engineering problems in new and challenging contexts and develop creative solutions applying engineering discipline knowledge.
- CLO4 : Communicate and collaborate effectively in the context of cross-cultural community and multi-disciplinary work.

<u>Detailed Assessment Description</u>

Context

The project presentation is designed to provide you with the opportunity to get feedback on your ideas, research and progress so far to strengthen the final outcomes of your project. The presentation will be attended by the development partners plus academics and researchers from across UNSW who have an interest in Humanitarian Engineering, sustainability and/or development studies. The content of the presentation should there be aimed at an educated and predominantly technical audience but you should assume that the audience has little background knowledge about the project that you are working on.

Details

Presentation is made as a group but marked are awarded individually.

The aims of this assessment are to 1) provide a forum for you to present your preliminary project outcomes and progress and receive feedback and directions to help you finalise the project and 2) to give you an opportunity to practice presenting.

Presentations will be during allocated class Lecture/Seminar time with each group allocated a 1 hour slot to present to the audience and hold discussions on what is needed to finalise the project. Each project group should arrange their presentation to allow each student to present for up to a maximum of 10 minutes with the total presentation providing a full and complete picture of the project and progress so far. Each student should speak about clearly defined subtopic(s) within the overall project scope so that an individual mark can be awarded. The assignment is worth 25% of your mark for ENGG4102 and is marked individually.

As a group your presentation should cover (at a minimum) the following topics:

1. Motivation and background to the problem
2. Description of work so far which may including literature reviews, preliminary scoping, results from field work, design and/or implementation of experiments
3. Questions you need help answering and plans for the remainder of semester

You should be clear at the start of your individual presentation what role/content you are going to be covering.

You should also be prepared to answer up to 10 minutes of questions and you should ensure

that everyone in the group has the opportunity to answer at least one question.

<u>Assignment submission Turnitin type</u>

This assignment is submitted through Turnitin and students do not see Turnitin similarity reports.

<u>Generative AI Permission Level</u>

No Assistance

This assessment is designed for you to complete without the use of any generative AI. You are not permitted to use any generative AI tools, software or service to search for or generate information or answers.

For more information on Generative AI and permitted use please see here.

Project report

<u>Assessment Overview</u>

The final report is a summary of the group's outcomes for the project. The report should be prepared and/or edited as a group and provide a holistic summary of the project aims, background, results and conclusions. The contribution of each student to the report will be assessed by peers and the academic mentor. The report should be professionally presented including formatting, layout, proper captioning, referencing and editing for spelling and grammar. An executive summary of up to 2 pages should be provided at the start of the report. A marking rubric will be provided and marks returned at the end of term.

<u>Course Learning Outcomes</u>

- CLO1 : Critically analyse engineering problems in new and challenging contexts and develop creative solutions applying engineering discipline knowledge.
- CLO2 : Apply appropriate technology and engineering system design principles to humanitarian engineering contexts incorporating social, economic and environmental factors.
- CLO3 : Apply systematic engineering approaches to the management of an engineering project.
- CLO4 : Communicate and collaborate effectively in the context of cross-cultural community and multi-disciplinary work.
- CLO5 : Show respect for ethical practice and social responsibility.
- CLO6 : Engage in independent and reflective learning.

<u>Detailed Assessment Description</u>

The final report is a summary of your group's outcomes for your project. The report should be prepared, edited and submitted as a group. The report should provide a holistic summary of the project aims, background, outcomes and recommended actions for future and sustainable

implementation. The intended audience for the report should be humanitarian engineering and non-engineering graduates as well as development professionals. Therefore, some technical literacy should be expected but an emphasis should be made to clearly document and explain report findings with clarity for this diverse audience. Humanitarian engineering is focused on human centred design and there must be an appreciation of whether proposed solutions are fit for purpose for the target community and/or development partner. To that end, it is important to demonstrate not only an understanding of the solution, but also the context of the community for which the solution is intended.

Report Submission

The Report is due on **Friday of Week 10 by 12:00 midday** on Moodle. Late submissions will be penalised 5% of final mark per day. The final report is worth 45% of your mark for ENGG4102. There will be a peer assessment activity on Moodle that needs to be completed in conjunction with the submission of the report. This will be for you to confidentially assess the contribution of each of your group members in undertaking the project and preparing the final report.

The report must be professionally presented as if you were submitting to a development partner or funding body. The report must be prepared and/or edited as a group and provide a holistic summary of the project aims, background, results and conclusions. A guide for the content is provided below but this is flexible depending on the nature of your project and ways that you think you can best provide outcomes.

The report should be professional presented including formatting, layout, proper captioning, referencing and editing for spelling and grammar. An executive summary of up to 2 pages should be provided at the start of the report.

The report should include some/all of the following (as appropriate for a particular project).

- Project aim
- Background
- Community/country context
- Data
- Methods
- Results/findings
- Conclusions
- Recommendations for further research to be completed
- Recommendations for the community / partner.

Note that these factors do not necessarily need to be used as the headings/chapters for the

report if there is a more logical way of presenting the project.

You may also want to consider providing the community recommendations in a format that could be used by the community (although no need to translate into community language).

Assignment submission Turnitin type

This assignment is submitted through Turnitin and students do not see Turnitin similarity reports.

Generative AI Permission Level

No Assistance

This assessment is designed for you to complete without the use of any generative AI. You are not permitted to use any generative AI tools, software or service to search for or generate information or answers.

For more information on Generative AI and permitted use please see here.

General Assessment Information

Grading Basis

Standard

Course Schedule

Teaching Week/Module	Activity Type	Content
Week 0 : 2 September - 8 September	Activity	O-week, no class
Week 1 : 9 September - 15 September	Lecture	Arrange into groups, set up regular meeting times, research the topic and familiarise yourself with context.
	Seminar	Makers Space inductions, awareness orf resources.
Week 2 : 16 September - 22 September	Lecture	Finalise project plan of approach and group roles.
	Seminar	Prototype design and development.
Week 3 : 23 September - 29 September	Lecture	Paciifc context when developing appropriate and suysatainable solutions. Sumbit your prelimiary refelctive journal.
	Seminar	Prototype design and development.
	Assessment	Preliminary journal submission due.
Week 4 : 30 September - 6 October	Lecture	Ugandan in-country deep dive and approach considerations based on collaboration to date.
	Seminar	Prototype preparation for presentation, identification of key knowledge gaps and needs to be shared in presentation.
Week 5 : 7 October - 13 October	Lecture	Project-to-project presnetation of work to date and trouble-shooting of problems encountered.
	Seminar	Reflection on progress and expectations to date.
Week 6 : 14 October - 20 October	Lecture	No class
	Seminar	No class
Week 7 : 21 October - 27 October	Lecture	Mid-point presentation assessment item in Lecture timetable slot.
	Seminar	Mid-point presentation assessment item in Seminar timetable slot.
	Assessment	Presentation due.
Week 8 : 28 October - 3 November	Lecture	Adamptive management - how to incorporate feedback form presentation audience and fianlise project.
	Seminar	Make adjustments / improvements bassed on knowledge gained from audience / external consultations.
Week 9 : 4 November - 10 November	Lecture	Interviews to be held in lecture timeslot.
	Seminar	Transferable skills and learings to date as a humanitarian engineer.
	Assessment	Interview assesment item due: individual timeslots for interview to be arranged.
Week 10 : 11 November - 17 November	Lecture	Lessons learned, challenges, scalability and replicability.
	Seminar	Finalise build/development phase to focus on documantation and final write up. What are next steps for a subsequent group?
	Assessment	Group report due
Week 11 : 18 November - 24 November	Assessment	Jorinal assesment item due

Attendance Requirements

Attendence at the lectures or watching the lecture recordings is required for this course.

Attendance in the non-recorded seminars is compulsary.

General Schedule Information

Lectures are on Tuesdays 11:00 - 13:00 in Mathews 311

Seminars are Tuesdays from 14:00 - 16:00 in Bioscience G07

Course Resources

Prescribed Resources

Provided in Moodle and by the humanitarian engineerign partners directly to the students.

Additional Costs

None

Course Evaluation and Development

Student feedback will be gathered by MyExperience and used to inform subsequent years of delivery, as this year has built on feedbacl of previous cohorts. Students are encouraged to proivide feedback in class throughout the Trimester also.

Staff Details

Position	Name	Email	Location	Phone	Availability	Equitable Learning Services Contact	Primary Contact
Administrator	Andrew Dansie		Room 306, H20		Contact to arrange time to meet or grab me after class.	Yes	Yes

Other Useful Information

Academic Information

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, or within 3 working days of, submitting an assessment or sitting an exam.

Please note that UNSW has a Fit to Sit rule, which means that if you sit an exam, 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.

IV. Professional Outcomes and Program Design

Students are able to review the relevant professional outcomes and program designs for their streams by going to the following link: https://www.unsw.edu.au/engineering/student-life/student-resources/program-design.

Note: This course outline sets out the description of classes at the date the Course Outline is published. The nature of classes may change during the Term after the Course Outline is published. Moodle or your primary learning management system (LMS) should be consulted for the up-to-date class descriptions. If there is any inconsistency in the description of activities between the University timetable and the Course Outline/Moodle/LMS, the description in the Course Outline/Moodle/LMS applies.

Academic Honesty and Plagarism

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

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;
- Exams, peer feedback and team evaluation surveys;
- Online quizzes where answers are released to students on completion;

- Professional assessment tasks, where the intention is to create an authentic assessment that has an absolute submission date; and,
- Pass/Fail assessment tasks.

Faculty-specific Information

Engineering Student Support Services – The Nucleus - enrolment, progression checks, 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

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)

School Contact Information

For assistance with enrolment, class registration, progression checks and other administrative matters, please see the Nucleus: Student Hub. They are located inside the Library – first right as you enter the main library entrance. You can also contact them via http://unsw.to/webforms or reserve a place in the face-to-face queue using the UniVerse app.

For course administration matters, please contact the Course Coordinator.

Questions about the this course should normally be asked during the scheduled class so that everyone can benefit from the answer and discussion.