

ENGG3001

Fundamentals of Humanitarian Engineering

Term 2, 2022



Course Overview

Staff Contact Details

Convenors

Name	Email	Availability	Location	Phone
Andrew Dansie	a.dansie@unsw.edu.au	Please email to arrange time to meet face to face or virtually.	H20, 306	MS Teams

Tutors

Name	Email	Availability	Location	Phone
James Hayes	j.e.hayes@unsw.edu.au			

Demonstrators

Name	Email	Availability	Location	Phone
Jack Lodge	jack.lodge@unsw.edu.au			
Jimmy Hilly	j.hilly@unsw.edu.au			
Eleanor Earl	e.earl@unsw.edu.au			
Cordelia Rentsch	c.edwards_rentsch@student.unsw.edu.au			

School Contact 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)

Course Details

Units of Credit 6

Summary of the Course

This course enables engineers to analyse and design infrastructure and appropriate technology to support the well-being and welfare of individuals and communities in disadvantaged circumstances. This includes developing countries as well as marginalised or remote communities in Australia. The course provides students with frameworks to analyse and respond to complex multi-disciplinary engineering problems. The concept of appropriate technology and capacity building are fundamental to this course. It provides context to the planning and design of infrastructure and technology in areas such as water and waste management, energy supply and distribution, assistive technologies; and provides a series of case studies to illustrate humanitarian engineering principles.

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.

Course Aims

This course enables engineers to analyse and design infrastructure and appropriate technology to support the well-being and welfare of individuals and communities in disadvantaged circumstances. At the end of the course, students will have developed:

- An understanding of humanitarian engineering, development and humanitarian action
- Skills for collaborative and multi-disciplinary work
- A respect for ethical practice and social responsibility
- Skills for effective communication
- Capacity for analytical and critical thinking and for creative problem solving
- Ability to engage independent and reflective learning

Course Learning Outcomes

1. Demonstrate understanding of the principles of Humanitarian Engineering
2. Differentiate the design considerations in Humanitarian Engineering contexts compared to traditional engineering projects
3. Evaluate the success of humanitarian engineering projects
4. Reflect on the skills and attributes required to work in humanitarian engineering contexts
5. Communicate effectively through an oral presentation
6. Reflect on the need for cultural sensitivity and ethical behaviour in humanitarian engineering projects

	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

Teaching Strategies

The course is based around a series of lectures highlighting a range of different fields of engineering

where humanitarian engineering projects have been undertaken, including challenges and problems that need to be addressed, successful approaches and community engagement. Guest lecturers with recent experience of humanitarian engineering projects will be invited to provide lectures and case study. Workshops will promote group work as well as a cross-cultural awareness and group presentations. The following teaching strategies will be used in the course:

Private Study / Group Work	<ul style="list-style-type: none"> • Review lecture material and textbook • Do set problems and assignments • Join Moodle discussions of problems • Reflect on class problems and assignments • Download materials from Moodle • Keep up with notices and find out marks via Moodle
Lectures	<ul style="list-style-type: none"> • Actively participate in lecture discussions • Find out what you should learn • Cover content not provided in readings or notes
Workshops	<ul style="list-style-type: none"> • Be active in workshops and group activities • Participate in guest lecture / workshop activities • Ask questions on assessment tasks
Assessments	<ul style="list-style-type: none"> • Demonstrate your knowledge and skills • Demonstrate higher understanding and problem solving

Assessment

All assignments must use harvard in-text citation and bibliography referencing system - see <https://www.student.unsw.edu.au/harvard-referencing>.

Assessment task	Weight	Due Date	Course Learning Outcomes Assessed
1. Presentations	20%	09/06/2022 05:00 PM	5
2. Humanitarian Engineering Reflection	30%	13/07/2022 05:00 PM	1, 4, 6
3. Project Report and Poster	50%	04/08/2022 12:00 PM	1, 2, 3

Assessment 1: Presentations

Submission notes: Slides due Thursday 9th June for everybody via Turnitin submission on Moodle. You will present in your workshop on either Friday Week 2 or Friday Week 3. You will be allocated to present in either Week 2 or 3 on Friday 10th June, announced in the Workshop.

Due date: 09/06/2022 05:00 PM

Deadline for absolute fail: Friday Week 4

Marks returned: 24th June

The aim of this assessment is to research, prepare and deliver an oral presentation on a Humanitarian Engineering topic in one of the UN Least Developed Countries. The assessment allows you to learn more about one of the UN Least Developed Countries as well as a technical challenge or thematic area in the Humanitarian Engineering discipline. You may pick the country and the thematic area/challenge for your presentation from the list of available topics on Moodle. However there will be no topic or country double ups allowed within each workshop so it will be first in first served for the presentation topics. The topic selection will be completed in your workshops. You must select your country and topic by the end of the Week 1 Friday 4th June. Your presentation should cover the following areas:

1. Brief introduction of the country and background to the current development situation
2. Country-specific details for the humanitarian thematic area/challenge, including what current interventions and research efforts are being undertaken
3. Findings and conclusions

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

Assessment criteria

The assignment is worth 20% of your mark for ENGG3001. The presentations will be assessed according to:

- Relevance of content
- Clarity of presentation style

- Effectiveness of presentation materials
- Ability to concisely and clearly answer questions

Peer assessment will count for 10% of your mark, with each of your peers providing an anonymous mark out of 10, considering the marking rubric.

This assignment relates to the following learning outcomes (see course profile): 1. Demonstrate understanding of the principles of Humanitarian Engineering and 2. Demonstrate high level communication skills through effective oral presentation

Assessment 2: Humanitarian Engineering Reflection

Assessment length: 1500 words

Due date: 13/07/2022 05:00 PM

Deadline for absolute fail: 20/07/2022 5:00 PM

Marks returned: 27/07/2022

This reflective piece of writing requires you to write an essay on the skills and opportunities that need to be identified and achieved in order to have a successful career as a humanitarian engineer. In the essay you should reflect on your own strengths and how these align with the skills required in Humanitarian Engineering. The reflection needs to focus on how your understanding has changed, or not, of the importance of geography and politics and their interactions with engineering and specifically Humanitarian Engineering. Your essay should be informed by your own reading, the guest lecturers in the course, and the workshop activities. The essay should reference any external sources that you have used using the Harvard referencing system.

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

Assessment criteria

The reflections will be assessed according to:

- clarity of reflection
- consideration of related external material as evidence
- depth of reflection and relevance of discussion
- awareness of underlying assumptions
- writing quality and presentation.

The assignment should be professionally presented including in-text citations, bibliography and editing for spelling and grammar.

Additional details

To learn more about reflection essays visit <https://student.unsw.edu.au/reflective-writing>

Assessment 3: Project Report and Poster

Assessment length: 25-30 pages

Due date: 04/08/2022 12:00 PM

Deadline for absolute fail: 04/08/2022

Marks returned: 18/08/2022

The report will be assessed based on the thoroughness of the project analysis and research, professional report standard and demonstration of a community centred approach. The poster will be presented in a Research Showcase and assessed by student peers and academics.

Assessment criteria

See assignment sheet on course Moodle page.

Note - you will be required to be physically present for the Research Showcase and your poster explanation will contribute to your overall grade.

Additional details

Content

See assignment sheet on course Moodle Page for full details on this assessment item for topic selection, group work approach and submission (poster printing/showing at Research Showcase, report submission process including peer assessment)

Report: The report should address the following points:

- a history of the project/technology beginnings
- the rationale and main stakeholders
- the project/technology design and planning process, including community participation
- the implementation model and sources of finance
- existing capacity and capacity-building activities
- standards and quality assurance
- impacts and outcomes/assessment of the long-term viability of the project/technology
- recommendations on how the project/technology could be improved
- contribution of the project/technology to humanitarian engineering, i.e. lessons learnt

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 and students are encouraged to use a structure tailored to their findings. Appropriate references should be included in the report (Harvard style). As a guide, your report should be 25-30 pages including figures and bibliography.

Poster: Please prepare your poster in A1 paper size for printing and hanging on the wall in the Research Showcase. When developing your poster you might like to draw on the following tips:

- Get your message across with visual displays and small blocks of supporting text. Think of your poster as an illustrated abstract.
- Tell readers why your work matters, what you did, what you found, and what you recommend.
- Avoid excessive focus on methods - it's the results and implications that count!
- Overall appearance, use a pleasing arrangement of graphics, text, colours. Your poster should be neat and uncluttered - use white space to help organise sections. Balance the placement of text and figures.

- Organisation, use the headings to help readers find what they're looking for: Context, objective, impact, conclusions, etc. A columnar format helps traffic flow in a crowded poster session.
- Minimize text - use graphics. Keep text in blocks of no more than 50-75 words - don't create large, monolithic paragraphs of prose, maintain enough 'empty space' to allow an ease of viewing and intake of message.
- Use colour cautiously. Dark letters on light background are easiest to read. Stick to a theme of 2-3 colours. Avoid overly bright colours.
- Don't fight reader gravity, which pulls the eyes from top to bottom (first), and left to right.
- Prepare a verbal explanation. Colleagues may ask you to "walk them through" your poster. In making such a presentation, avoid reading the poster. Instead, give the big picture, explain why the problem is important, and use the graphics on your poster to illustrate and support your findings and recommendations.

Attendance Requirements

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

Course Schedule

This course has no exam and engagement and discussion in the lectures and workshops is required to successfully incorporate humanitarian engineering concepts into your summative tasks and do well in the course. Physical presence is essential in the Workshops in Weeks 2 and 3 for the presentation assessment task as well as the Week 10 Research Showcase ("Other" timeslot in schedule) where you present your group posters. Attendance in Week 4 from 10:00 - 15:00 (Lecture and "Other" timeslot) for the interactive water, energy, food social simulation is a highlight of the class based on student feedback in previous years.

[View class timetable](#)

Timetable

Date	Type	Content
O-Week: 23 May - 27 May		
Week 1: 30 May - 3 June	Lecture	Lecture 1 - Introduction to Humanitarian Engineering and ENGG3001
	Lecture	Lecture 2 - Geopolitics and History
	Workshop	Workshop - Geopolitics activity / selection of presentation topic for presentation in Week 2-3
Week 2: 6 June - 10 June	Lecture	Lecture 1 - United Nations Sustainable Development Goals
	Lecture	Lecture 2 - Sphere Guidelines, Introduction
	Workshop	Ignite presentations - assessment item
	Assessment	Ignite presentations (first half of Workshop group)
	Assessment	Presentations: Slides due Thursday 9th June for everybody via Turnitin submission on Moodle. You will present in your workshop on either Friday Week 2 or Friday Week 3. You will be allocated to present in either Week 2 or 3 on Friday 10th June, announced in the Workshop.
Week 3: 13 June - 17 June	Lecture	Lecture 1 - International Development and Need
	Lecture	Lecture 2 - Community and Engagement
	Workshop	Ignite presentations - assessment item

	Assessment	Ignite presentations (second half of Workshop group)
Week 4: 20 June - 24 June	Lecture	Lecture 1 - Water and development, the Nexus
	Lecture	Lecture 2 - Water, Energy, Food Social Simulation (extends into "Other"/Workshop timeslot)
	Workshop	Water, Energy, Food Social Simulation (extends from Lecture 2 timeslot)
Week 5: 27 June - 1 July	Lecture	Lecture 1 - Energy and development
	Lecture	Lecture 2 - Human Rights
	Workshop	Group work / feedback from demonstrators
Week 6: 4 July - 8 July	-- Select --	No classes
Week 7: 11 July - 15 July	Lecture	Lecture 1 - Sendai Framework (1 of 2)
	Lecture	Lecture 2 - Sendai Framework (2 of 2) and engineering for a resilient future
	Workshop	Virtual reality experience
	Assessment	Humanitarian Engineering Reflection
Week 8: 18 July - 22 July	Lecture	Lecture 1 - Sphere Guidelines (1 of 2)
	Lecture	Sphere Guidelines (2 of 2)
	Workshop	Human-centered design
Week 9: 25 July - 29 July	Lecture	Lecture 1 - Climate change adaptation and disaster risk reduction
	Lecture	Lecture 2 - Ethics
	Workshop	Group work / demonstrator feedback
Week 10: 1 August - 5 August	Lecture	Lecture 1 - Nature-based solutions and sustainable approaches
	Lecture	Working in Humanitarian Engineering
	Workshop	Research Showcase - poster presentation (assessment item)
	Assessment	Project Report and Poster

Resources

Prescribed Resources

Please see course page on Moodle

Recommended Resources

Please see course page on Moodle

Course Evaluation and Development

MyExprience results are reviewed at end of term and used to improve course for delivery the following year.

Submission of Assessment Tasks

Please refer to the Moodle page of the course for further guidance on assessment submission.

UNSW has a standard late submission penalty of:

- 5% per day, for all assessments where a penalty applies, capped at five days (120 hours), after which a student cannot submit an assessment, and no permitted variation.

Academic Honesty and 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 Information

Final Examinations:

Final exams in T2 2022 will be held online between 12th - 25th August 2022 inclusive, and supplementary exams between 5th - 9th September 2022 inclusive. You are required to be available on these dates. Please do not to make any personal or travel arrangements during this period.

ACADEMIC ADVICE

- Key Staff to Contact for Academic Advice (log in with your zID and password): <https://intranet.civeng.unsw.edu.au/key-staff-to-contact-during-your-studies-at-unsw>
- [Key UNSW Dates](#) - eg. Census Date, exam dates, last day to drop a course without academic/financial liability etc.
- CVEN Student Intranet (log in with your zID and password): <https://intranet.civeng.unsw.edu.au/student-intranet>
- Student Life at CVEN, including Student Societies: <https://www.unsw.edu.au/engineering/civil-and-environmental-engineering/student-life>
- Special Consideration: <https://student.unsw.edu.au/special-consideration>
- General and Program-Specific Questions: [The Nucleus: Student Hub](#)
- Book an Academic Advising session: <https://app.acuityscheduling.com/schedule.php?owner=19024765>

Disclaimer

This course outline sets out 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 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 (as updated in Moodle), the description in the Course Outline/Moodle applies.

Image Credit

Photo taken by A. Dansie

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.