



School of Civil and Environmental Engineering

Term 2, 2021

ENGG3001 FUNDAMENTALS OF HUMANITARIAN ENGINEERING

COURSE DETAILS

Units of Credit	6	
Contact hours	6 hours per week	
Class	Tuesday, 10:00 -12:00	Online, Blackboard Ultra
	Friday, 10:00 - 12:00	Online, Blackboard Ultra
Workshop	Tuesdays 12:00 -14:00 (Wk 1, 3, 4, 5, 7-10)	Face to Face, John Goodsell LG21
	Tuesday 12:00 -14:00 (Wk 2)	Face to Face, MCIC Event Space (Hilmer Building G26)
	Tuesdays, 12:00 -14:00	Online, Blackboard Ultra

NB Face to Face and Online Workshops are separate groups with separate demonstrators and not offered in hybrid format.

Course Coordinator and Lecturer Dr Andrew Dansie
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office: CE306
phone: Arrange to call on Microsoft Teams during COVID-19 remote teaching

INFORMATION ABOUT 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.

HANDBOOK DESCRIPTION

See link to virtual handbook:

<https://www.handbook.unsw.edu.au/undergraduate/courses/2021/ENGG3001>

OBJECTIVES

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 in independent and reflective learning.

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 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 role play 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

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. <i>Demonstrate understanding of the principles of Humanitarian Engineering</i>	PE1.3, PE1.6
2. <i>Demonstrate understanding of the important design considerations in Humanitarian Engineering projects.</i>	PE1.5
3. <i>Evaluate the success of humanitarian engineering projects</i>	PE2.4
4. <i>Analyse the skills and attributes required to work in humanitarian engineering contexts</i>	PE3.5, PE3.6
5. <i>Demonstrate high level communication skills through effective oral presentation</i>	PE3.2
6. <i>Demonstrate cultural sensitivity and ethical behaviour</i>	PE3.1

For each hour of contact it is expected that you will put in at least 1.5 hours of private study.

COURSE PROGRAM

Term 2 2021

Week beginning	Topic	Lecture Content	Demonstration Content
31/05/2021 (Week 1)	- Introduction to HE - Geopolitics and history / Social Simulation introduction	A. Dansie A. Dansie	Geopolitics activity, Ignite presentation Country and Topic selection
07/06/2020 (Week 2)	- Who are the players in development & defining need - Community-led Development	A. Dansie C. Kutay (CDU)	Design Thinking, Michael Crouch Innovation Centre
14/06/2020 (Week 3)	- Infrastructure and Development - Humanitarian Panel	S. Johnson (World Bank)	Ignite presentations / Group Work
21/06/2020 (Week 4)	- Engineering ethics in development projects - Urban disaster resilience and humanitarian aid	R. Care (RedR Australia) D. Sanderson	Ethics Scenarios / Ignite presentations extra time if needed / Group Work
28/06/2020 (Week 5)	- Climate change adaptation and disaster risk reduction - Food Security	F. Johnson J. Sellahewa (CSIRO/WFP)	Group Work and feedback from Demonstrators
05/07/2020 (Week 6)		<i>Flexibility week for all courses (non-teaching)</i>	
12/07/2020 (Week 7)	- Human Health and WaSH - Energy	P. Byleveld (NSW Health / Red Cross) A. Bruce	Virtual Reality Lab
19/07/2020 (Week 8)	- Frameworks for HE - Water	S. Schmeidl A. Dansie	San Alberta Scenario
26/07/2020 (Week 9)	- Humanitarian Architecture with UNHCR - Human Rights	D. Anderson (UNHCR) Australian Human Rights Institute	Group Work and feedback from Demonstrators
02/08/2020 (Week 10)	- Research Showcase - Research Showcase		Group Work and feedback from Demonstrators

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 on page 5.

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

PENALTIES

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.

RELEVANT RESOURCES

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

DATES TO NOTE

Refer to MyUNSW for Important Dates available at:

<https://student.unsw.edu.au/dates>

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

For information about:

- Notes on assessments and plagiarism;
- Special Considerations: student.unsw.edu.au/special-consideration;
- General and Program-specific questions: [The Nucleus: Student Hub](#)
- Year Managers and Grievance Officer of Teaching and Learning Committee, and
- CEVSOC/SURVSOC/CEPCA

Refer to Key Contacts on the Faculty website available at:

<https://www.unsw.edu.au/engineering/student-life/student-resources/key-contacts>

ASSESSMENT OVERVIEW

Item	Weighting	Learning outcomes assessed	Assessment Criteria	Due date	Deadline for absolute fail	Marks returned
Presentations	20%	5	Presentations will be assessed on content and communication style including timing, technical information, clarity of speech, clarity and usefulness of visual aids.	Tuesday 15th June (Week 3)	Friday 25 th June (Week 4)	Friday 25 th June (Week 4)
Humanitarian Engineering Reflection	30%	4, 6	Essay reflecting on skills and opportunities for a career in humanitarian engineering and your world view after taking the course.	Wednesday 14 th July (Week 7)	Wednesday 21 st July (Week 8)	Wednesday 28 th July (Week 9)
Project report and poster	50%	1, 2, 3	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 and clarity of poster presentation.	Poster: Wednesday 28 th July (Week 9) Report: Friday 6 th August (Week 10)	Friday 13 th August (Week 11)	Friday 20 th August (Week 12)

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