Te Hoe Waihaka me te Hoahoaka

Department of Engineering & Architectural Studies

New Zealand Diploma in Engineering (NZDE)

Course outline for

Engineering Project (Civil)

DE6102

Semester 1, 2021

Ara

Institute of Canterbury

Ara rau, taumata rau

Welcome

This course is project-based; most of the learning and assessment is through the completion of a group project study.

The course requires students to spend a minimum of 110 self-directed hrs

Students are expected to integrate and synthesise previously acquired knowledge and skills and apply them to a civil engineering project with minimum guidance from the tutor.

Evidence that demonstrates a good understanding of issues in civil engineering construction practices may include, for example, the ability to:

- Define and analyses problems
- Apply technical skills and engineering management skills for problems solving
- Sound engineering judgement
- Appreciate the impacts of safety, quality, environmental and sustainability issues and requirements of the project and stakeholders
- Communicate with project stakeholders at various stages

Academic staff

Name	Role	Office	Phone	Email address
Lindsey Alton	Tutor	K202	021 9408090	Lindsey.Alton@ara.ac.nz
My hours of work are Mon – Thus 8:30am – 2:30pm				

Timetable

	Monday	Tuesday	Wednesday	Thursday	Friday
8am –9am					
9am – 12am		DE6102 Civil + Mech K323			

Supplementary resources

Standards, Guidelines and Regulatory

- NZS 3109: 1997 Concrete construction
- NZS 3124: 1987 Specification for concrete Construction for minor works
- NZS 4404: 2004 Land Development and Subdivision Engineering

- Health and Safety At Works Act (2015)
- Work Safe New Zealand
- Approved Code of Practice for safety in excavation and shafts for foundations, OSH 1995
- NZTA Resources in NZTA web sites:
    - Specifications (materials)
    - Manual (Quality assurance; Structures, Safety management, Environment and resource planning)
    - 1989 State highway pavement and rehabilitation manual.
    - 1991 A handbook for temporary traffic control and safety at roadwork sites.
    - 2016 Code of Practice for Temporary Traffic Management 4th ed.
    - Bridge Design Manual 3rd ed.
    - Highway structure design guide
- Geotechnical Engineering Society, NZ Geotechnical Engineering Practices Modules 1 to 6
- Engineering NZ Code of Ethics
- Building Performance Regulatory compliance
- New Zealand History, cultures and heritage, https://www.govt.nz/
- Resource Management Act 1991
- NZ Environment Guide http://www.environmentguide.org.nz/

Library Resources

- Engineering applications in sustainable design and development; Striebig, Bradley A. author. ; Ogundipe, Adebayo A., author. ; Papadakis, Maria, author. 2016 Call Number: TA170STR ISBN: 1133629784 Publication Date: 2015
- Professionalism and ethics [video recording] General Collection Call Number: TA157PRO Association of Professional Engineers of Ontario. ; Association of Professional Engineers, Geologists and Geophysicists of Alberta. ; Direct Hit Productions. ; Insight Media (Firm); Red Engine Productions.
- Civil Engineering Project Management, 4th Edition A. C. Twort and J. Gordon Rees Publisher CRC Press LLC 2003-12-23 TA 190.T86 2004

Course Descriptor

DE6102 ENGINEERING PROJECT

Level 6 **Credits 15**

LEARNING TIME

Indicative Directed Hours	Self-Directed Hours	Total Hours
40	110	150

RECOMMENDED PRE-REQUISITE (ALL STRANDS)

DE4103 Technical Literacy and 45 credits Level 5

Civil

DE4201 Materials (Civil)
DE5207 Geotechnical Engineering 1

Mechanical/Fire

DE4301 Engineering CAD

RECOMMENDED CO-REQUISITE

DE6101 Engineering Management

AIM/PURPOSE

To apply knowledge and problem-solving skills to plan and complete an engineering project relevant to the strand studied (civil, mechanical, electrical or electronics) to accepted practice and standards from a given specification.

LEARNING OUTCOMES

On successful completion of this course, the student should be able to:

1. Develop preliminary design(s), based on a given specification, for an engineering project relevant to their strand (Civil, Mechanical, Electrical, Electronics, Fire)
2. Develop a plan or design parameters considering functionality, safety, environmental, cultural and ethical issues
3. Undertake well-defined planning and produce as project output
4. Produce supporting documentation relevant to project output
5. Evaluate compliance of the project output against specification

6. Present findings to an audience in a professional manner

INDICATIVE CONTENT

Mechanical/Fire

- Design process and methodology, design briefs, concepts, stakeholder requirements, alternatives, evaluation, decision making, design standards.
- Producing a detailed design, design evaluation and review, identify and apply relevant design codes.
- Material selection, determining and applying criteria, considering alternatives, selection, specification.
- Design reports, documenting the design, calculations, drawings, specifications, writing a report, design presentations

Civil

- Research options for planning and construction to meet specifications of aselected civil engineering project.
- Identification and application of relevant standards basic design commissioning methodology, detailed plan, safety requirements, environmental impact.
- A written structured report that includes executive summary, aim, background, preliminary design calculation, drawings and specification, discussion, references.
- Presentation of an overview of the project to peers and/or industry representatives.

Electrical/Engineering

- Research options for design to meet specifications.
- Detailed design or plan, construct or simulated design and commission, identify and apply relevant standards.
- Document the design, calculations, drawings, specification, write a report
- Present an overview of the project to peers and industry representatives.

ASSESSMENT

Assessment Type	Weighting	Outcomes Assessed
Project and presentation	100%	1, 2, 3, 4, 5, 6

* See Section 3.5 of Regulations

ENGINEERING NZ TECHNICIAN ATTRIBUTES

The International Engineering Attributes are developed across the entire learning journey of NZDE.

This Project enables evidence that the student exhibits the attributes expected of the graduate. Evidence of these attributes is to be collected as part of consistency of outcomes.

	IEA Graduate Attributes	Outcome
1.	Engineering Knowledge	A
2.	Problem Solving	A
3.	Design /Development of Solutions	A
4.	Investigation	A
5.	Modern Tool Usage	A
6.	The Engineer and Society	A
7.	Environment and Sustainability	✓
8.	Ethics	A
9.	Individual and Team Work	✓
10.	Communication	A
11.	Project Management and Finance	A
12.	Lifelong Learning	A

Key:

✓ Course contributes to attribute **A** Attribute is assessed and evidence is collected

Updated October 2020

Prior Learning

Students are expected to apply what they have learnt from previous courses, e.g. highway, water and waste, civil engineering structures, materials and geotechnical engineering to progress their project with minimum guidance from the tutor.

To be able to enjoy and confidently complete the project, all students need to have passed the following subjects:

- Land Surveying
- Civil and Structural Drawing
- Geotechnical Engineering
- Hydraulics
- Water and wastewater
- Highway Engineering

Students should enrol in this course as one of the last courses done on the program. They should be completing most of other Level 6 courses before enrolling on this course.

Assessments

The breakdown of course assessment and weighting are as below:

Item	Outcomes assessed (refer project brief for details)		LO	Weighting	Due
1	Mini Puzzle	Design and build, evaluation and participation	1 to 5	10%	9/3
2	Concept development	Concept design, options and planning;	1 to 6	5%	13/4
		10 min group presentation			
3	Concept and Final proposal	Report: Design proposal and construction plans	1 to 5	70%	15/6
		Final group Presentation marked individually	6	10%	8/6
4	Dialogue	Questions and Answer with each student	1 to 5	0.0 to 1.0*	15/6
5	Evaluation	Evaluation of team performance throughout	1 to 5	5%	NA

Assessment 1 is an individual assessment. Assessments 2-5 are group assessments.

Submissions will be online via Moodle before **2300 hours on the due date AND** in **PDF file format**. Late or email submission receives no marks. Some assessments will be during class time.

There are evaluations of the group performance, and individual performance (refer to rubrics) in a team set up throughout the course.

In the dialogue, the student and tutor discuss the project. The student should show an understanding of the project planning and development process and tools used to develop the project throughout the process.

Depending on the performance, each student would have a score of 0.0 to 1.0 from the dialogue (refer to the rubric in Moodle).

The score from the dialogue is then used to multiply the group marking to reach the individual performance as follow:

Individual final grade = [Dialogue score]* x [Σ Group marks from item 1 and 2 above]

There is no examination in this course, to pass this course, the student must achieve a minimum mark of 50% overall and attempt (compulsory) all assessments, including discussions with team members and tutor, field trips and talks.

Please refer to your program documents for details and requirements.