



Resource & Environmental Management

Semester 1, 2021

Course Tutors

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Welcome to Resource & Environmental Management

Haere mai – Talofa lava

The aim of this course is to develop an understanding of how civil engineering processes impact on the natural environment and to mitigate against these effects to achieve a level of sustainability. In addition to design, examination of the legislation and the practical application of this legislation will provide a holistic approach to sustainability within the industry.

This course covers the following topics

Topic One: Resource Management Act and Urban Planning

Topic Two: Assessment of Environmental Effects

Topic Three: Environmental Management Plans

Topic Four: Sustainable Solutions for the Built Environment, including Water and Energy

Student's Guide to Success

It is essential that you attend **ALL** classes. Many of the ideas covered in class **are not found in text books and it may be difficult to catch up.**

Investigations will form part of your class work. These tasks are designed to extend your thinking and group work will be essential to complete these tasks. The grades from these investigations may not be included in your final grade for this course.

Anchoring new learning by practice and revision is extremely important in any subject, especially engineering. For every one hour of class time you are expected to do about one hour of self-directed study at home or in a study group. This means in a week you need to schedule in **4 hours** of self-directed study time on top of your class time. Assignments and homework will be given frequently to re-enforce your class work and completion of this is **essential** to your success.

Requirements to Pass

This course consists of two assignments, a number of short homework exercises and an exam. You must attempt all assignments to pass this course. Assignments may involve individual or group presentations and/or written work. Assignments are worth 60% of your final mark, assignment 1 (AEE) and assignment 2 (Sustainable design) are each worth 20% of the final mark. These projects should represent about 20 hours of work. There are 2 homework exercises, each worth between 10% of your final mark (representing about 7 hours work). The exam is worth 40% of your total course mark.

Originality and Referencing

Your assessed work must be your own. If you have quoted from or referred to someone else's work this is usually allowed, as long as you reference it correctly.

Late Assignments/Assessments Policy

Up to 5 days late with no communication

- Accepted or sit test within 5 days
- Assessment eligible only for 80% of the given mark
- Approved by lecturer

Application for an extension

- SAC form required (Special Assessment Circumstances application – student central)
- Students given 5 days grace
- Assessment marked as usual
- Approved by lecturer
- Approved by Programme Leader, in consultation with the lecturer/s involved and the Student Support person. Extension and new due date approval or decline to be communicated to student by PL.
- Appeals will be heard by the Programme Committee

Resits

- A student cannot resit an assignment or test they have not previously sat.
- Therefore, all students must undertake one of the above actions – or hand assignment/assessment in on time!

Before resitting a test you must make sure you understand the mathematics. If you need help, make an appointment for a tutorial with Te Puna Ako or Maia or with your tutor before the resit. Remember, we (the tutors) will help all we can. So talk to us, ask questions in class, come and see us privately and make use of the Unitec support services.

Student support

Your lecturers are here to help you with your work for this course. If you feel that you need extra support the following services are available:

For learning advice and support:

Mt Albert campus: Te Puna Ako Maia Centre for Pacific Development and Support

Waitakere campus: Te Whare Manaaki

Kia Kaha

Course Calendar

		Wednesday (11-1pm)	Friday (8:30-10:30am)
Week 1	1 st March	Introduction to Resource Management Act	Assessment of Environmental Effects
Week 2	8 th March	Land & Water	Site Visit – Kennedy Park
Week 3	15 th March	Homework 1 Presentations	Individual Class Visits*
Week 4	22 th March	Site visit – Auckland Zoo	Flora & Fauna
Week 5	29 th March	Infrastructure, Traffic & Environmental Management	No Class (Easter Friday)*
Week 6	5 th April	People & Social Impact Assessment	Māori Worldview
Week 7	12 th April	Assignment 1 Presentations	Introduction to Sustainable Design
<i>Mid Semester Study Break 19th April- 30th April</i>			
Week 8	3 rd May	Sustainable Materials	Green Buildings
Week 9	10 th May	Site Visit – Green Buildings	Eco-brick 1
Week 10	17 th May	Green Buildings – Green star	Sustainable Design (Homework 2 hand-in)
Week 11	24 th May	Sus-design - Energy	Eco-brick 2
Week 12	31 st May	Site Visit - Sustainable Communities	Water
Week 13	7 th June	Assignment 2 Presentations	Revision
*Students are not required to attend class on these days			

(PROVIDER CODE) MG7109 RESOURCE AND ENVIRONMENTAL MANAGEMENT

Level 5

Credits 15

Version 25 Feb 13

LEARNING TIME

Directed Hours	Self Directed Hours	Total Hours
75	75	150

PREREQUISITE

Nil

CO-REQUISITE

Nil

PURPOSE/AIMS

To develop an understanding of how civil engineering processes impact on the natural environment and to mitigate against their effects to achieve sustainability.

LEARNING OUTCOMES

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

1. Critically analyse the application of the Resource Management Act to the Civil Engineering industry.
2. Create and evaluate an Assessment of Environmental Effects (AEE) and translate its implications to an environmental management plan
3. Critically appraise the impact of Civil Engineering processes on the natural environment and sustainability.
4. Critically appraise the Resource Management Act from a Maori world view perspective including the consideration of any regional differences.

CONTENT

- Resource Management Act
- Urban Planning
- Assessment of Environmental Effects (AEE)
- Environmental Management Plans
- Sustainable solutions for the built environment, including water and energy.

ASSESSMENT

Assessment Type	Weighting	Outcomes Assessed
Assignments	60%	2-4
Exam	40%	1-4

*To pass this course, the student must achieve a minimum mark of 50% overall and attempt all assessments.

LEARNING AND TEACHING STRATEGIES

As appropriate to the practices and resources of the delivering institution. Typically a blend of the following.

- Lectures
- Tutorials
- Web technologies
- Computer Simulation
- Project Investigations
- Case Studies
- Site Visits
- Visiting Guest Lecturers
- Videos
- Laboratories
- Group work

LEARNING AND TEACHING RESOURCES

As selected by the delivering institution, consistent with indicative resources outlined in the BEngTech Teaching and Assessment Plans, and reviewed and approved annually by the Metro Management Group.

IPENZ BENGTECH GRADUATE ATTRIBUTES

	IPENZ BENGTECH GRADUATE ATTRIBUTES	OUTCOME
1.	Understanding of Engineering Science	1-4
2.	Problem Formulation, Analysis & Solution	1-4
3.	Design, Development & verification of Solutions	1-4
4.	Research and Experimentation	3-4
5.	Evaluation and Management of Risk	2-4
6.	Team Work	1-4
7.	Communication	1-4
8.	Ethics and Responsibility to Society	2-4
9.	Project and Business Management	4
10.	Product Synthesis	-

Course Assessments

This course has two types of assessment, which are collectively worth 60% of your final marks, these include:

1. Shorter **homework** exercises
2. Longer project based **assignments**

Both types of assessment are compulsory for this course and are an essential component of learning at level 7. The assignments are worth 20% each and comprise of two projects. Assignment 1 involves the creation of an assessment of environmental effects for a theoretical civil engineering development in a local location. Assignment 2 involves data collection and the creation of a sustainable housing design.

Table 1: Course breakdown: assessments and homework exercises

Assessment	Assessment type	Course Breakdown
Assignment 1 (AEE)	Presentation + written report	20%
Assignment 2 (Sustainable Design)	Presentation + written report	20%
Homework 1 (AEE Case Study)	Presentation	10%
Homework 2 (Sustainable Design)	Written report	10%
Exam	Closed book	40%
Total		100%

Homework Exercises

There are two homework exercises for this course and each is worth 10% of the total course marks.

1. Assessment of Environmental Effects - Case Study

Your individual homework task is to investigate a case study of an AEE to achieve the following criteria:

- Summarise the main issues; you may like to consider them in the same order as the course to help with structure, e.g. Intro (set scene), land, water, flora and fauna (with a specific focus on native species affected), people and infrastructure and traffic.
- Describe how the effects have been minimised or mitigated.
- Discuss the potential benefits of this scheme (how has this been made attractive to the council?)
- What was the final decision? Were any conditions applied?

You will have to search on the internet for case studies. Try to avoid any very large projects like the Waterview tunnel (unless they have a good succinct executive summary).

Your feedback should be in the form of an oral presentation - 10 mins max. (there will be a time penalty for presentations over 11 mins) with references embedded into the presentation as supplied as a list (APA style).

2. Sustainable Materials

This is an individual assignment. You will be required to research and summarise sustainable building practice information about ONE country, including current legislation, building practice and construction materials used. You will be asked to discuss any legislation/guidelines or standards used and their impact on improving building practice. Your final output will be a written report.

Choose a city from your native country (or one that you are familiar with), if you are from NZ, please consider an alternative from the list provided below:

China, UK, India, Australia, USA, South Africa, Japan, Brazil, Mexico, Germany, France, Russia
Singapore.

For the city you have chosen:

1. Prepare a short descriptive paragraph about your chosen city (this must NOT be cut and paste from Wikipedia). Each paragraph should include details such as location, climate, population size, topography and main industry etc.
2. Discuss how houses are built focusing on typical materials used, and whether these materials are sustainable? (for example, are the materials produced locally or transported from overseas; do they recycle their building products).
3. Investigate if there are any existing guidelines/standards (government/non-government or both?) on how to build a sustainable building for this location. If so, what is the guideline focus (e.g. greenhouse emissions, sustainable materials, human health). Summarise any the legislation, guidance and standards by providing the following detail:
 - Whether from government or non-government agency
 - When were these standards/guidelines created and when was the most recent version produced?
 - Is this compulsory legislation/standards or just guidelines?
 - Is there anything being done to encourage people to follow it?
 - Is there any information available about the number of buildings currently using this guidance? (this will be easy to find for LEED, NZGBC etc. but trickier for government organisations).
4. In your opinion, are the houses adequate for the climate and geographic conditions of the city or country?
5. Using the diagram provided as an example (Fig 1), create your own diagram to summarise how well these buildings follow sustainable strategies in your chosen country.

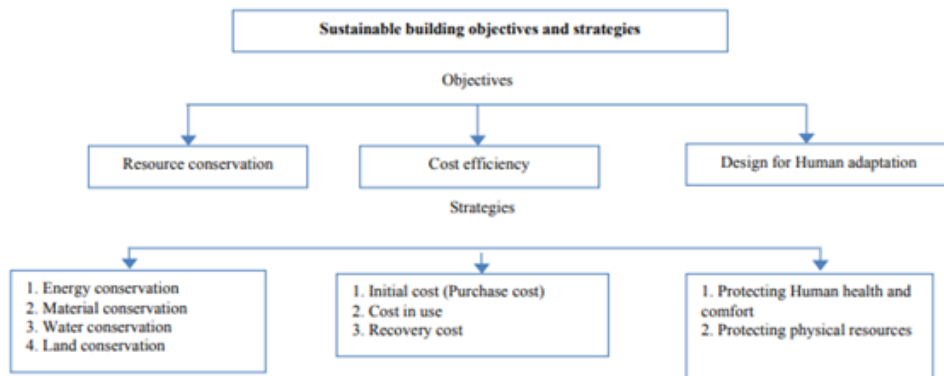


Figure 1: Demonstration Sustainability in Buildings

Your feedback should be in the form of a short, written report (submitted to Turnitin)- no longer than 6 pages in length (including reference list for websites and relevant articles used).

Assignments

There are two assignments for this course as detailed in the following chapters. Each assignment is worth 20% of your total marks.

1. Creation of an AEE

This is a project involving the creation of an AEE for a theoretical development in the local area. Some of the possible options available are:

- Restoration of the Orakei basin
- Extension of the Takapuna wharf
- Creation of a bridge from Paremoremo to Greenhithe
- The creation of an extra lane for highway 16 at Te Atatu
- An alternative ferry service from Te Atatu to Westhaven
- Installation of a bike/pedestrian bridge alongside Pakuranga Highway
- The creation of a cycleway along the SW highway (20) to connect with Woodward Rd
- Development of a 3-storey high rise building in Pt Chevalier

The outputs include a written report detailing the likely impacts of the civil work and with suggestions for mitigation as directed by learning in the first part of the course. You should include a section which consider any native flora or fauna based on your fieldtrip experience plus previous course learning. Which species may be present? How vulnerable are they? How could they be protected? An oral component is also required in the form of a 10-minute feedback presentation. This project is worth 20% of the total mark.

PLEASE SEE INDIVIDUAL HANDOUTS FOR FULL DETAILS (to be distributed in week 3).

2. Sustainable design

There are two stages to this project for which both must be completed to achieve full marks. The first stage involves data collection which includes a waste audit and regular monitoring of water and energy usage and transportation mileage. There is also a comprehensive environmental assessment of your current accommodation. The second stage involves a proposed upgrade of your current property to a more sustainable home.

Stage 1

For the duration of this course, you will be required to carry out an audit of the energy, water and waste at your house. For the waste audit, you will be provided with a number of containers in which to separate and weigh your waste. In addition, you will need to produce an audit of your transportation.

Energy Audit

1. Do you have any alternative energy (Inc Solar, microhydro etc.)? If so determine how much energy is produced via these processes.
2. Using a spreadsheet format, collect weekly electrical energy usage data for your accommodation.
3. If you use any solid fuel, record your daily usage (approximate mass).
4. If you have gas on your property, make a record of your annual consumption

Water Audit

1. Do you have any water harvesting or water recycling at your property? If so determine how much water is produced via these processes.
2. Using a spreadsheet format, collect weekly water usage data for your accommodation.

Waste Audit

1. Using a set of bins, separate your waste into plastic recyclables, glass, metal, paper and card waste, non-recyclable waste and food waste.
2. Make a note of the weekly mass of each of the waste.
3. Using a spreadsheet, create a waste audit for your property.

Transport Audit

1. To produce a better assessment of your green footprint, keep a daily log of your journeys. Note the type of transportation and distance you travel each time and also note whether you are travelling singularly or as a group.
2. If you travel by car, try to estimate the fuel economy of this transportation.

This information will be used to complete your second project (which is worth 20% of the marks for this course). For this reason, it is extremely important that you carry out this task diligently and thoroughly.

Stage 2

Analysis

The next step in this project is to assess the environmental impact of your house and transport situation. You may use any on-line assessment tool. Tools currently available include the following:

- BRANZ ([Http://alf.branz.co.nz](http://alf.branz.co.nz))
- Healthy Housing Index (HHI)
- House energy rating (try EECA Energy wise)
- Centre for alternative technology (CAT)

You may need to use more than one tool to fully assess your current environment impact from your living//transportation situation, as the majority of on-line assessment tools are based on energy efficiency.

You will also need to produce a scale floor layout of your house and a description of the following points:

- Energy sources e.g. electricity, gas, solid fuel, solar etc. Please provide a definition for "energy usage".
- Orientation of the house (mark North on the map)
- Location of the key living areas (and indicate which direction they face if not clear)

- Thermal mass details e.g. wall and ceiling construction including insulation (type and location). Please provide definitions for "thermal conductivity" and "thermal resistivity".

Low budget and unlimited budget retrofits

Finally - the up-grade. You will be required to provide two options for the upgrade of your current living environment. The first upgrade involves a low budget retrofit (maximum cost \$2000) which must be justified in terms of benefit. Costs must be assessed and be realistic therefore you should provide trade literature to support any estimates.

The second upgrade is an unlimited budget upgrade in which you must choose and justify improvements to minimise the environmental impact of your house. Your submission should include a concept plan (which is a basic floor plan with descriptions).

Please do not to forget to include discussion on the key challenges to any retrofit/changes. For example, adding insulation may not be possible for all types of wall without a considerable reduction in room size or adding a photovoltaic panel to the roof may not be feasible on a particular roof type or orientation.

A list of helpful sites is provided below and will be added to during the course so check regularly.

For information on energy try the following site: Passiv house, New Zealand:

<http://www.phinz.org.nz/>

The marking schedules for both assignments are available on the moodle site under the assignments button <https://moodle.unitec.ac.nz/mod/book/view.php?id=212030&chapterid=19325>