UNSW Course Outline

GSOE9830 Economic Decision Analysis in Engineering - 2024

Published on the 21 May 2024

General Course Information

Course Code : GSOE9830
Year : 2024
Term : Term 2
Teaching Period : T2
Is a multi-term course? : No
Faculty : Faculty of Engineering
Academic Unit : School of Mechanical and Manufacturing Engineering
Delivery Mode : Multimodal
Delivery Format : Standard
Delivery Location : Kensington
Campus : Sydney
Study Level : Postgraduate
Units of Credit : 6

Useful Links

Handbook Class Timetable

Course Details & Outcomes

Course Description

Project initiation and development, review of practical decision-making problems and relevant techniques, benefit/cost analysis, time value of money, Nominal and effective interest rate, calculation involving multiple interest formulae, internal rate of return, payback period method,

comparisons of alternative investments, depreciation methods, income tax consideration, inflation, replacement analysis, sensitivity analysis, life-cycle costing, economic analysis of projects.

Course Aims

The course focuses on providing comprehensive coverage of the concepts of economic decision analysis in engineering while addressing practical concerns of engineering economic analysis. This course aims to provide engineers and managers with the knowledge of principles, basic concepts, and methodology of economic decision analysis. The gained knowledge through the course can assist students in developing proficiency with the methods and the processes for making rational decisions they are likely to encounter in their professional practice.

Course Learning Outcomes

Course Learning Outcomes
CLO1 : Apply the knowledge of systematic evaluation of the costs and benefits of proposed technical and business project and ventures
CLO2 : Understand cost concepts, cash flows, their estimation and interest formulae. Also, to understand various depreciation methods and learn about the effect of income tax on economy studies
CLO3 : Be familiar with various methods for economy studies and comparing alternative investments
CLO4 : Understand the role of probability analysis in decision making and decision tree analysis
CLO5 : Value information and analyse a portfolio of investments
CLO6 : Carry out Monte Carlo simulations

Course Learning Outcomes	Assessment Item
CLO1 : Apply the knowledge of systematic evaluation of the costs and benefits of proposed technical and business project and ventures	• Weekly Quizzes • Mid-term test
CLO2 : Understand cost concepts, cash flows, their estimation and interest formulae. Also, to understand various depreciation methods and learn about the effect of income tax on economy studies	• Weekly Quizzes • Mid-term test
CLO3 : Be familiar with various methods for economy studies and comparing alternative investments	• Weekly Quizzes • Mid-term test
CLO4 : Understand the role of probability analysis in decision making and decision tree analysis	• Final end-of-term examination • Weekly Quizzes
CLO5 : Value information and analyse a portfolio of investments	• Final end-of-term examination • Weekly Quizzes
CLO6 : Carry out Monte Carlo simulations	• Final end-of-term examination • Weekly Quizzes

Learning and Teaching Technologies

Moodle - Learning Management System | Microsoft Teams

Assessments

Assessment Structure

Assessment Item	Weight	Relevant Dates
Weekly Quizzes Assessment Format: Individual	0%	Start Date: Not Applicable Due Date: Not Applicable
Mid-term test Assessment Format: Individual	50%	Start Date: 27/06/2024 06:00 PM Due Date: Not Applicable
Final end-of-term examination Assessment Format: Individual	50%	Start Date: Not Applicable Due Date: Not Applicable

Assessment Details

Weekly Quizzes

Assessment Overview

Assessment length: Short questions

Marks returned: Feedback is given instantly in class.

The class quiz includes short questions that require short calculations or descriptive answers.

The quiz questions are later uploaded on Moodle so the students can take them again and assess their understanding.

The weekly quizzes start at week 2.

Assessment criteria

Additional details
The students don't have to submit their answers after the class but will get feedback about the right answers during the class.

Course Learning Outcomes

- CLO1 : Apply the knowledge of systematic evaluation of the costs and benefits of proposed technical and business project and ventures
- CLO2 : Understand cost concepts, cash flows, their estimation and interest formulae. Also, to understand various depreciation methods and learn about the effect of income tax on economy studies
- CLO3 : Be familiar with various methods for economy studies and comparing alternative investments
- CLO4 : Understand the role of probability analysis in decision making and decision tree

analysis
- CLO5 : Value information and analyse a portfolio of investments
- CLO6 : Carry out Monte Carlo simulations

Assignment submission Turnitin type

Not Applicable

Mid-term test

Assessment Overview

Assessment length: 2 hours

The Midterm test consists of questions that require descriptive answers and/or short calculations.

This is an open-book test.

The students are provided with written feedback after the test.

The students need to demonstrate the rationale of their calculation. Using Excel software is allowed if the exam is online.

If the Exam is online, it will be on Moodle. Otherwise, printed booklets are provided for face-to-face examination.

Course Learning Outcomes

- CLO1 : Apply the knowledge of systematic evaluation of the costs and benefits of proposed technical and business project and ventures
- CLO2 : Understand cost concepts, cash flows, their estimation and interest formulae. Also, to understand various depreciation methods and learn about the effect of income tax on economy studies
- CLO3 : Be familiar with various methods for economy studies and comparing alternative investments

Assessment Length

two hours

Assignment submission Turnitin type

This is not a Turnitin assignment

Final end-of-term examination

Assessment Overview

Assessment length: 2 hours

The final exam has questions that require descriptive answers and/or calculations.

Assessment criteria

The final examination for the course is a written end-of-session examination of two hours duration and will include material covered in the second half of the term (approximate).

The final exam will happen during the exam period.

The students need to demonstrate the rationale of their calculation. Using Excel software is allowed if the exam is online.

If the Exam is online, it will be on Moodle. Otherwise, printed booklets are provided for face-to-face examination.

Course Learning Outcomes

- CLO4 : Understand the role of probability analysis in decision making and decision tree analysis
- CLO5 : Value information and analyse a portfolio of investments
- CLO6 : Carry out Monte Carlo simulations

Assessment Length

2 hours

Assignment submission Turnitin type

This is not a Turnitin assignment

General Assessment Information

Grading Basis

Standard

Course Schedule

Teaching Week/Module	Activity Type	Content
Week 0 : 20 May - 26 May	Activity	
Week 1 : 27 May - 2 June	Lecture	Introduction, Net cash flow analysis, Net cash flow and profit, Taxation.
Week 2 : 3 June - 9 June	Lecture	Net present value (NPV), Features of NPV, Real and Nominal NPVs
	Tutorial	Review and tutorial
Week 3 : 10 June - 16 June	Lecture	Net present value (NPV), Features of NPV, Real and Nominal NPVs
	Tutorial	Review and tutorail
Week 4 : 17 June - 23 June	Lecture	Internal Rate of Return (IRR), Multiple IRRs, Comparing Investments
	Tutorial	Tutorail and review
Week 5 : 24 June - 30 June	Lecture	Incremental net cash flow, Tax relief
	Tutorial	Tutorial and review
	Assessment	Mid term exam Thursday, 18-20 PM
Week 6 : 1 July - 7 July	Reading	No lecture-flexibilit week Reading material is provided
Week 7 : 8 July - 14 July	Lecture	Uncertainty in decision analysis, Sensitivity analysis, Probability distributions
Week 8 : 15 July - 21 July	Lecture	Multiple random variable analysis and, Usingcskewed probability distributions, Monte Carlocsimulation
	Tutorial	Review and tutorial
Week 9 : 22 July - 28 July	Lecture	Uncertain decisions and risk sharing
	Tutorial	Tutorial and review
Week 10 : 29 July - 4 August	Lecture	Decision tree part two
	Tutorial	Review and tutorial

Attendance Requirements

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

Course Resources

Prescribed Resources

Lecture outlines, course notes and exercises will be provided on Moodle.

Moodle: https://moodle.telt.unsw.edu.au/login/index.php

Recommended Resources

Text Book 1

W.G. Sullivan, E.M. Wicks, C.P. Koelling, “Engineering Economy”, Prentice Hall

International, 17th Ed., 2018.

This textbook is available for purchase at the UNSW book shop.

Text Book 2 (optional)

“Decision Analysis for Petroleum Exploration”, Paul Newendorp and John Schuyler, Planning Press 2000

UNSW Library website can be accessed at https://www.library.unsw.edu.au/

Course Evaluation and Development

Feedback on the course is gathered periodically using various means, including the UNSW myExperience process, informal discussion in the final class for the course, and the School’s Student/Staff meetings. Your feedback is taken seriously, and continual improvements are made to the course based, in part, on such feedback.

In this course recent improvements resulting from previous years’ feedback include more real-life examples and case studies, as well as problems solved in demonstration and provided on Moodle. All of these suggestions are incorporated into the course syllabus.

Staff Details

Position	Name	Email	Location	Phone	Availability	Equitable Learning Services Contact	Primary Contact
Convenor	Dr. Shiva Abdoli			(02) 9348 0088	9:00 - 12:00 midday and by appointment	No	Yes
Lecturer	Guy Allinson			(02) 9385 5189	9:00 - 12:00 midday and by appointment (week 1-5)	No	No

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-specific Information

Short Extensions

Short extensions are not currently applicable to Mechanical and Manufacturing Engineering Courses.

Review of Results

The purpose of a review of results is if there was a marking error. Review of results is for when you have cause to believe that there is a marking error. Review of Results cannot be used to get feedback. If you would like feedback for assessments prior to the final exam, you are welcome to contact the course convenor directly. No feedback will be provided on final exams.

Use of AI

The use of AI is prohibited unless explicitly permitted by the course convenor. Please respect this and be aware that penalties will apply when unauthorised use is detected, such as through Turnitin. If the use of generative AI, such as ChatGPT, is allowed in a specific assessment, they must be properly credited, and your submissions must be substantially your own work.

School Contact Information

Location

UNSW Mechanical and Manufacturing Engineering

Ainsworth building J17, Level 1

Above Coffee on Campus

Hours

9:00–5:00pm, Monday–Friday*

*Closed on public holidays, School scheduled events and University Shutdown

Web

School of Mechanical and Manufacturing Engineering

Engineering Student Support Services

Engineering Industrial Training

UNSW Study Abroad and Exchange (for inbound students)

UNSW Future Students

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)

(+61 2) 9385 4097 – School Office**

**Please note that the School Office will not know when/if your course convenor is on campus or available

Email

Engineering Student Support Services – current student enquiries

- e.g. enrolment, progression, 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

School Office – School general office administration enquiries

- NB: the relevant teams listed above must be contacted for all student enquiries. The School will only be able to refer students on to the relevant team if contacted

Important Links

- Student Wellbeing
- Urgent Mental Health & Support
- Equitable Learning Services
- Faculty Transitional Arrangements for COVID-19
- Moodle
- Lab Access

- Computing Facilities
- Student Resources
- Course Outlines
- Makerspace
- UNSW Timetable
- UNSW Handbook