GSOE9830

ECONOMIC DECISION ANALYSIS IN ENGINEERING

Contents

1. Staff contact details

Contact details and consultation times for course convenor

Name: Dr Maruf Hasan
Office location: Room 208H, Building J17
Tel: (02) 9385 5629
Fax: (02) 9663 1222
Email: m.hasan@unsw.edu.au

Consultation time for Maruf Hasan is on Fridays between 2.00 and 5.00 pm.

Name: Guy Allinson
School of Petroleum Engineering
Office location: Room 249, Tyree Energy Technology Building
Tel: (02) 9385 5189
Email: g.allinson@unsw.edu.au

Contact details and consultation times for additional demonstrators will be provided on Moodle before the start of semester.

Please see the course Moodle.

2. Important links
- Moodle
- UNSW Mechanical and Manufacturing Engineering
- Course Outlines
- Student intranet
- UNSW Mechanical and Manufacturing Engineering Facebook
- UNSW Handbook

3. Course details

Credit Points:

This is a 6 unit-of-credit (UoC) course, and involves **3** hours per week (h/w) of face-to-face contact.

The UNSW website states "The normal workload expectations of a student are approximately 25 hours per semester for each UoC, including class contact hours, other learning activities, preparation and time spent on all assessable work. Thus, for a full-time enrolled student, the normal workload, averaged across the 16 weeks of teaching, study and examination periods, is about 37.5 hours per week."

This means that you should aim to spend about 9 h/w on this course. The additional time should be spent in making sure that you understand the lecture material, completing the set assignments, further reading, and revising for any examinations.

There is NO parallel teaching in this course.

Contact Hours

	Day	Time	Location
Lectures	Wednesday	15:00-17:00	Tyree Engineering Technology G16
Demonstrations	Wednesday	17:00-18:00	Ainsworth Building 203
	Wednesday	17:00-18:00	Ainsworth Building 204

Please refer to your class timetable for the learning activities you are enrolled in and attend only those classes.

Summary and Aims of the course

The course consists of two sections:
- Section 1 (Week 1-6, 13) : Dr Maruf Hasan
- Section 2 (Week 7-12): Guy Allinson

The course will focus on providing comprehensive coverage of the concepts of economic decision analysis in engineering and will also address practical concerns of engineering economic analysis.

The objective of the course is to provide engineers and managers with the knowledge of principles, basic concepts and methodology of economic decision analysis. This will assist the students in developing proficiency with the methods and with the process for making rational decisions they are likely to encounter in professional practice.

Student 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.	Apply the knowledge of systematic evaluation of the costs and benefits of proposed technical and business project and ventures	PE 1.2, PE1.3, PE2.4, PE3.4
2.	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	PE1.2, PE1.3, PE3.4
3.	Be familiar with various methods for economy studies and comparing alternative investments	PE 2.3, PE 2.4, PE3.4
4.	Understand the role of probability analysis in decision making and decision tree analysis	PE1.1, PE 1.2, PE 1.3, PE2.4, PE3.4
5.	Value information and analyse a portfolio of investments	PE 2.1, PE 2.2, PE 2.3, PE3.1 - PE 3.6
6.	Carry out Monte Carlo simulations	PE 2.1, PE 2.2, PE 2.3, PE2.4

4. Teaching strategies

Readings and lectures will be used to introduce and explain the theoretical foundations of various economic analysis principles. Problem solving exercises will be used to apply and reinforce the understanding of the concepts and how they can be applied to solve problems encountered in the real world. Students are expected to complete the assigned readings prior to lectures so that they can contribute to class discussions. Students will be required to form groups to discuss and solve the case study problems.

For Section 2 of the course, students should bring a laptop computer to each lecture and each demonstration. Students will use these to help solve the class exercises and demonstration questions.

5. Course schedule

Module A

Week	Date	Topic	Text reference	Demonstration exercises
1	28/02	Engineering economic decisions, cost concepts, time value of money, interest formulae	1,4	4.1, 5,6, 8, 31 ,36, 57, 65, 66, 68, 70, 71, 73, 77, 79, 80, 81, 82, 85, 91, 111, 115
2	07/03	Present worth(NPV)analysis, future worth, annual worth	5	5.3, 4, 21, 23, 24, 27, 32
3	14/03	Internal rate of return, payback period method	5	5. 41, 45, 47, 49, 53, 54, 60, 63, 67
4	21/03	Comparing alternative investments	6	6.2, 4,12, 13, 15, 19, 28, 31, 35, 37, 41, 45, 52, 53, 57, 67, 70
5	28/03	Depreciation methods	7	7.7, 8, 11, 12, 14
	04/04	Mid-semester break		
6	11/04	Income taxes	7	7.23, 32, 38, 39, 40, 41, 42, 47, 55, 60

Module B

Week	Date	Topic
7	18/04	Limitations of sensitivity analysis Using probability distributions
8	25/04	Public Holiday
9	02/05	Exploration decisions and Binomial distributions
10	09/05	Decision trees
11	16/05	Value of information
12	23/05	Monte Carlo simulation Portfolio analysis

Course revision (Week 13)

13	30/05	Lecture/Course Revision

We reserve the right to change lecturers and topics depending on the availability of the lecturers and the progress of the course

6. Assessment

The assessment will be through class tests and a final examination. The various parts of the course contributing to the overall grade are as follows:

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

The final examination for the course is a written end-of-session examination of two hours duration and will include material covered in the whole course (Sections 1 and 2). The final exam has questions that require more substantial descriptive answers and/or calculations.

You must be available for all tests and examinations. Final examinations for each course are held during the University examination periods, which are June for Semester 1 and November for Semester 2.

Provisional Examination timetables are generally published on myUNSW in May for Semester 1 and September for Semester 2

For further information on exams, please see the Exams section on the intranet.

Calculators

You will need to provide your own calculator, of a make and model approved by UNSW, for the examinations. The list of approved calculators is shown at
https://student.unsw.edu.au/exam-approved-calculators-and-computers

It is your responsibility to ensure that your calculator is of an approved make and model, and to obtain an "Approved" sticker for it from the School Office or the Engineering Student Centre prior to the examination. Calculators not bearing an "Approved" sticker will not be allowed into the examination room.

Assessment overview

Assessment	Length	Weight	Learning outcomes assessed	Assessment criteria	Due date and submission requirements	Deadline for absolute fail	Marks returned
Module A class test	1.25 hrs	20%	1-3	Correct descriptions, correct calculations, logical conclusions	Week 5	N/A	Two weeks after submission
Module B class test	1.25 hrs	20%	4	Correct descriptions, correct calculations, logical conclusions	Week 10	N/A	Two weeks after submission
Final exam	2 hrs	60% overall: (30% Module A) (30% Module B)	1-6	Correct descriptions, correct calculations, logical conclusions	Exam period, date TBC	N/A	During results period

Special consideration and supplementary assessment

For details of applying for special consideration and conditions for the award of supplementary assessment, see the School intranet, and the information on UNSW's Special Consideration page.

7. Attendance

You are required to attend a minimum of 80% of all classes, including lectures, labs and seminars. It is possible to fail the course if your total absences equal to more than 20% of the required attendance. Please see the School intranet and the UNSW attendance page for more information.

8. Expected resources for students

Text book 1
W.G. Sullivan, E.M. Wicks, C.P. Koelling, "Engineering Economy", Prentice Hall International, 16th Ed., 2014.
This textbook is available for purchase at the UNSW book shop.

Textbook 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/

Lecture outlines and course notes will be provided on Moodle.

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

9. Course evaluation and development

Feedback on the course is gathered periodically using various means, including the myExperience process, informal discussion in the final Problem solving session 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 and increasing the proportion of coursework for assessment, as well as problems solved in demonstration and provided on Moodle. All of these suggestions are incorporated into the course syllabus.

10.   Academic honesty and plagiarism

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: 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.

If plagiarism is found in your work when you are in first year, your lecturer will offer you assistance to improve your academic skills. They may ask you to look at some online resources, attend the Learning Centre, or sometimes resubmit your work with the problem fixed. However more serious instances in first year, such as stealing another student's work

or paying someone to do your work, may be investigated under the Student Misconduct Procedures.

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) even suspension from the university. The Student Misconduct Procedures are available here:
www.gs.unsw.edu.au/policy/documents/studentmisconductprocedures.pdf

Further information on School policy and procedures in the event of plagiarism is available on the intranet.

11. Administrative matters and links

All students are expected to read and be familiar with School guidelines and polices, available on the intranet. In particular, students should be familiar with the following:

- Attendance, Participation and Class Etiquette
- UNSW Email Address
- Computing Facilities
- Assessment Matters (including guidelines for assignments, exams and special consideration)
- Academic Honesty and Plagiarism
- Student Equity and Disabilities Unit
- Health and Safety
- Student Support Services

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