



UNSW Course Outline

ZEIT4216 Occasional Option 2 - 2024

Published on the 04 Jul 2024

General Course Information

Course Code : ZEIT4216

Year : 2024

Term : Semester 2

Teaching Period : Z2

Is a multi-term course? : No

Faculty : UNSW Canberra

Academic Unit : School of Engineering and Technology

Delivery Mode : In Person

Delivery Format : Standard

Delivery Location : UNSW Canberra at ADFA

Campus : UNSW Canberra

Study Level : Undergraduate

Units of Credit : 6

Useful Links

[Handbook Class Timetable](#)

Course Details & Outcomes

Course Description

This course provides an elementary but comprehensive introduction to engineering econometrics. It covers basic economic principles and their applications in the analysis of engineering decisions. In particular, the concepts of “time value of money”, and “cashflow

diagrams” which are the cornerstone of all evaluation methods will be covered at the beginning of the course. Thereafter, this course will provide a detailed discussion on the decision-making process for engineering decisions, and the commonly used methods of proposal evaluation by different sectors. This includes “present worth”, “cost benefit analysis” and “minimum rate of return” methods. Along with the technical methods and economic principals, this course will briefly touch on the importance of the intentions behind any economic action by drawing from works in sociology, political economy, and sustainability for background materials. The course is primarily designed for civil engineering students, but the methods and concepts delivered are applicable to other disciplines as well.

Relationship to Other Courses

This course bridges theoretical knowledge with practical economic analysis skills that are crucial for effective engineering decision-making. This elective directly supports courses in project management, infrastructure planning, and sustainable design by providing essential economic evaluation tools needed for cost estimation, budget management, and financial feasibility analysis. It offers tools for analysing the economic viability of projects, including cost-benefit analyses of public infrastructure installations and the economic assessment of alternative solutions.

Course Learning Outcomes

| Course Learning Outcomes | Engineers Australia - Professional Engineer (Stage 1) |
|----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CLO1 : Understand fundamentals of engineering economics such as time value of money | <ul style="list-style-type: none"> • PEE1.3 : In-depth understanding of specialist bodies of knowledge within the engineering discipline |
| CLO2 : Develop, analyse, and evaluate engineering project cash flows | <ul style="list-style-type: none"> • PEE2.1 : Application of established engineering methods to complex engineering problem solving • PEE2.2 : Fluent application of engineering techniques, tools and resources |
| CLO3 : Perform standard economic analyses to compare and evaluate engineering projects | <ul style="list-style-type: none"> • PEE2.1 : Application of established engineering methods to complex engineering problem solving • PEE2.2 : Fluent application of engineering techniques, tools and resources |
| CLO4 : Undertake methods of sensitivity analysis and expected-value decisions | <ul style="list-style-type: none"> • PEE1.2 : Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline • PEE1.3 : In-depth understanding of specialist bodies of knowledge within the engineering discipline • PEE2.1 : Application of established engineering methods to complex engineering problem solving |

| Course Learning Outcomes | Assessment Item |
|----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| CLO1 : Understand fundamentals of engineering economics such as time value of money | <ul style="list-style-type: none"> • QUIZ 1 • QUIZ 2 • QUIZ 3 • Final Exam |
| CLO2 : Develop, analyse, and evaluate engineering project cash flows | <ul style="list-style-type: none"> • QUIZ 1 • QUIZ 2 • Final Exam |
| CLO3 : Perform standard economic analyses to compare and evaluate engineering projects | <ul style="list-style-type: none"> • QUIZ 3 • QUIZ 2 • Final Exam |
| CLO4 : Undertake methods of sensitivity analysis and expected-value decisions | <ul style="list-style-type: none"> • QUIZ 3 • Final Exam |

Learning and Teaching Technologies

Moodle - Learning Management System

Learning and Teaching in this course

Course materials will be delivered in weekly lectures within an interactive environment, designed to engage students through group learning activities. The tutorials offer an opportunity for students to take responsibility for their learning and receive formative feedback from the lecturer to facilitate their understanding. During the tutorials, students also have the chance to discuss any questions they may have with the lecturer and seek clarification as needed.

I am committed to the philosophy of purposeful learning. Under this philosophy, the structure of degree programs and the syllabuses for each course are meticulously designed to fulfill valuable objectives. This ensures that students are fully aware of the purpose behind their studies, and lecturers remain conscious of the intent underlying their teaching practices.

The Learning Management System

Moodle is the Learning Management System used at UNSW Canberra. All courses have a Moodle site which will become available to students at least one week before the start of semester. Please find all help and documentation (including Blackboard Collaborate) at the [Moodle Support](#) page.

UNSW Moodle supports the following web browsers:

» Google Chrome 50+

» Safari 10+

** Internet Explorer is not recommended

** Addons and Toolbars can affect any browser's performance.

Operating systems recommended are:

Windows 7, 10, Mac OSX Sierra, iPad IOS10

For further details about system requirements click [here](#).

Log in to Moodle [here](#).

If you need further assistance with Moodle:

For enrolment and login issues please contact:

IT Service Centre

Email: itservicecentre@unsw.edu.au

Phone: (02) 9385-1333

International: +61 2 9385 1333

For all other Moodle issues please contact:

External TELT Support

Email: externalteltsupport@unsw.edu.au

Phone: (02) 9385-3331

International: +61 2 938 53331

Opening hours:

Monday – Friday 7:30am – 9:30 pm

Saturday & Sunday 8:30 am – 4:30pm

Additional Course Information

This course offers a foundational yet thorough introduction to engineering econometrics. It begins with an exploration of basic economic principles and their applications in engineering decision-making. Key concepts such as the "time value of money" and "cash flow diagrams" will be introduced early in the course. Subsequent lessons will delve into the decision-making processes for engineering projects and examine the methods commonly used for proposal evaluation across various sectors. These methods include "present worth," "cost-benefit analysis," and "minimum rate of return". While primarily tailored for civil engineering students, the methods and concepts taught are also applicable to other disciplines.

Academic Integrity and Plagiarism

UNSW has an ongoing commitment to fostering a culture of learning informed by academic integrity. All UNSW staff and students have a responsibility to adhere to this principle of academic integrity. All students are expected to adhere to UNSW's Student Code of Conduct <https://www.gs.unsw.edu.au/policy/documents/studentcodepolicy.pdf>

Plagiarism undermines academic integrity and is not tolerated at UNSW. *It is defined as using the words or ideas of others and passing them off as your own, and can take many forms, from*

deliberate cheating to accidental copying from a source without acknowledgement.

For more information, please refer to the following:

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

Referencing

In this course, students are required to reference following the APA 7 / Chicago NB referencing style. Information about referencing styles is available at: <https://guides.lib.unsw.adfa.edu.au/c.php?g=472948&p=3246720>

Study at UNSW Canberra

<https://www.unsw.adfa.edu.au/study>

Study at UNSW Canberra has lots of useful information regarding:

- Where to get help
- Administrative matters
- Getting your passwords set up
- How to log on to Moodle
- Accessing the Library and other areas.

Additional Information as required

CRICOS Provider no. 00098G

The University of New South Wales Canberra.

Assessments

Assessment Structure

| Assessment Item | Weight | Relevant Dates | Engineers Australia - Professional Engineer (Stage 1) |
|------------------------------------------------|--------|----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| QUIZ 1 Assessment Format: Individual | 10% | Start Date: 01/08/2024 10:00 AM Due Date: Not Applicable | <ul style="list-style-type: none"> • PEE1.3 : In-depth understanding of specialist bodies of knowledge within the engineering discipline • PEE2.1 : Application of established engineering methods to complex engineering problem solving • PEE2.2 : Fluent application of engineering techniques, tools and resources |
| QUIZ 2 Assessment Format: Individual | 20% | Start Date: 12/09/2024 10:00 AM Due Date: Not Applicable | <ul style="list-style-type: none"> • PEE2.1 : Application of established engineering methods to complex engineering problem solving • PEE1.3 : In-depth understanding of specialist bodies of knowledge within the engineering discipline • PEE2.2 : Fluent application of engineering techniques, tools and resources |
| QUIZ 3 Assessment Format: Individual | 20% | Start Date: 17/10/2024 10:00 AM Due Date: Not Applicable | <ul style="list-style-type: none"> • PEE1.2 : Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline • PEE2.1 : Application of established engineering methods to complex engineering problem solving • PEE1.3 : In-depth understanding of specialist bodies of knowledge within the engineering discipline • PEE2.2 : Fluent application of engineering techniques, tools and resources |
| Final Exam Assessment Format: Individual | 50% | Start Date: Not Applicable Due Date: Not Applicable | <ul style="list-style-type: none"> • PEE1.1 : Comprehensive, theory based understanding of the underpinning natural and physical sciences and the engineering fundamentals |

| | | | |
|--|--|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | | applicable to the engineering discipline • PEE2.1 : Application of established engineering methods to complex engineering problem solving • PEE3.3 : Creative, innovative and pro-active demeanour • PEE3.4 : Professional use and management of information |
|--|--|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Assessment Details

QUIZ 1

Assessment Overview

This item contributes to 10% of the final grade and runs during the tutorial in week 3. The syllabus covers the materials covered in weeks 1 and 2.

Course Learning Outcomes

- CL01 : Understand fundamentals of engineering economics such as time value of money
- CL02 : Develop, analyse, and evaluate engineering project cash flows

Detailed Assessment Description

This assessment is conducted in-class. You will access the questions via Moodle and are also required to submit your solutions there. The duration of the exam is 60 minutes.

Assessment Length

60 minutes

Assignment submission Turnitin type

This is not a Turnitin assignment

QUIZ 2

Assessment Overview

This item contributes to 20% of the final grade and runs during the tutorial in week 7. The syllabus covers the materials covered in weeks 3 to 6

Course Learning Outcomes

- CL01 : Understand fundamentals of engineering economics such as time value of money
- CL02 : Develop, analyse, and evaluate engineering project cash flows
- CL03 : Perform standard economic analyses to compare and evaluate engineering projects

Detailed Assessment Description

This assessment is conducted in-class. You will access the questions via Moodle and are also required to submit your solutions there. The duration of the exam is 60 minutes.

Assessment Length

60 min

Assignment submission Turnitin type

This is not a Turnitin assignment

QUIZ 3

Assessment Overview

This item contributes to 20% of the final grade and runs during the tutorial in week 12. The syllabus covers the materials covered in weeks 7 to 11

Course Learning Outcomes

- CL01 : Understand fundamentals of engineering economics such as time value of money
- CL03 : Perform standard economic analyses to compare and evaluate engineering projects
- CL04 : Undertake methods of sensitivity analysis and expected-value decisions

Detailed Assessment Description

This assessment is conducted in-class. You will access the questions via Moodle and are also required to submit your solutions there. The duration of the exam is 60 minutes.

Assessment Length

60 min

Assignment submission Turnitin type

This is not a Turnitin assignment

Final Exam

Assessment Overview

The final exam is a two-hour comprehensive test held during the final exam period, covering material from the entire course

Course Learning Outcomes

- CL01 : Understand fundamentals of engineering economics such as time value of money
- CL02 : Develop, analyse, and evaluate engineering project cash flows
- CL03 : Perform standard economic analyses to compare and evaluate engineering projects
- CL04 : Undertake methods of sensitivity analysis and expected-value decisions

Detailed Assessment Description

This assessment will be an in-person, invigilated exam.

Assessment Length

120 min

Assignment submission Turnitin type

This is not a Turnitin assignment

General Assessment Information

All marks obtained from assessment items during the session are provisional. The final mark, as published by the university following the assessment review group meeting, is the only official mark.

The assessment components of this course are designed to ensure that the knowledge and understanding demonstrated are your own, providing a measure of your grasp of the material. These components consist of three quizzes and one final exam. Each quiz is worth 20% of the final grade, amounting to a total of 60%. The quizzes, each lasting one hour, will be conducted during workshop hours.

Quiz 1 will be held in week 3, written feedback and grades will be given to students before the census date (11 August).

The final exam, a comprehensive two-hour test held during the final exam period, covers material from the entire course and accounts for the remaining 40% of the final grade.

Late submissions are not allowed for either the quizzes or the final exam.

The use of generative AI tools is prohibited during the quizzes and the final exam.

Grading Basis

Standard

Requirements to pass course

To pass the course, students must achieve an overall mark of at least 50%. Additionally, a minimum of 45% must be scored on the final exam to pass.

Course Schedule

| Teaching Week/Module | Activity Type | Content |
|--------------------------------------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Week 1 : 15 July - 19 July | Lecture | Explore the basics of engineering economics, focusing on the concept of "time value of money" in financial decisions and visualizing cash flows. |
| Week 2 : 22 July - 26 July | Lecture | <ul style="list-style-type: none"> Economic Equivalence Understand the concept of economic equivalence as a foundation for comparing financial amounts that occur at different times. Nominal and Effective Interest Learn to differentiate between nominal and effective interest rates and their implications on financial calculations. |
| | Tutorial | <ul style="list-style-type: none"> Time Value of Money, Cash Flow Diagrams Economic Equivalence Nominal and Effective Interest |
| Week 3 : 29 July - 2 August | Lecture | Present Value Analysis Examine the technique of present value analysis to assess the current worth of future cash flows. |
| | Assessment | Quiz 1 |
| Week 4 : 5 August - 9 August | Lecture | Annual Equivalent Value Analyze how to convert various cash flows into a uniform annual series to simplify decision-making. |
| | Tutorial | <ul style="list-style-type: none"> Present Value Analysis Annual Equivalent Value |
| Week 5 : 12 August - 16 August | Lecture | Rate of Return Study the methods for determining the profitability and feasibility of potential investments. |
| | Tutorial | Rate of Return |
| Week 6 : 19 August - 23 August | Lecture | Cost Benefit Analysis Evaluate the economic viability of public investments by comparing the expected costs and benefits. |
| | Tutorial | Cost Benefit Analysis |
| Week 7 : 9 September - 13 September | Lecture | Depreciation Understand methods for calculating the depreciation of assets, crucial for financial reporting and tax calculations. |
| | Assessment | Quiz 2 |
| Week 8 : 16 September - 20 September | Tutorial | Depreciation |
| Week 9 : 23 September - 27 September | Lecture | <ul style="list-style-type: none"> Replacement Decision Learn to determine the optimal timing for replacing assets by analyzing economic and operational factors. Inflation Consider the effects of inflation on cash flows and the real value of money over time. |
| | Tutorial | <ul style="list-style-type: none"> Replacement Decision Inflation |
| Week 10 : 30 September - 4 October | Lecture | Risk and Uncertainty Explore approaches to managing uncertainty and risk in economic evaluations and decisions. |
| | Tutorial | Risk and Uncertainty |
| Week 11 : 7 October - 11 October | Lecture | Guest Lecturer Session Gain insights from industry experts about the practical applications of economic analysis in engineering. This session will highlight how the methods taught are applied in real-world scenarios, enhancing understanding and providing professional context. |
| Week 12 : 14 October - 18 October | Lecture | Guest Lecturer Session Gain insights from industry experts about the practical applications of economic analysis in engineering. This session will highlight how the methods taught are applied in real-world scenarios, enhancing understanding and providing professional context. |
| | Assessment | Quiz 3 |
| Week 13 : 21 October - 25 October | Lecture | <ul style="list-style-type: none"> Review Session This session is dedicated to reviewing key concepts and methods covered throughout the course. It offers a chance to clarify doubts, discuss complex topics, and prepare for final assessments, ensuring a comprehensive understanding of the course material. |
| | Tutorial | <ul style="list-style-type: none"> Review Session |

Attendance Requirements

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

General Schedule Information

The course is structured to include both lectures and tutorials to facilitate comprehensive learning. Lectures are conducted in three-hour sessions and are scheduled on Wednesdays from 12:00 PM to 3:00 PM. These sessions are designed to cover the core material and provide a broad understanding of the course content.

Tutorials are held in two-hour sessions and are scheduled on Thursdays from 10:00 AM to 12:00 PM. These sessions are intended to reinforce lecture materials through hands-on activities and discussions, allowing students to apply concepts and clarify any uncertainties.

The exemptions to the regular lecture and tutorial schedules are:

- No lecture on 18th Sep (Week 8) - Military training session - Wednesday lost
- No Tutorial on 10th Oct (Week 10) - Military training session - Thursday lost

The following quizzes are scheduled during tutorial sessions:

- Quiz 1 on 1st Aug (Week 3)
- Quiz 2 on 12 Sep (Week 7)
- Quiz 3 on 17 Oct (Week 12)

Course Resources

Prescribed Resources

This course does not have any prescribed resources.

Recommended Resources

- Park, Chan S., Contemporary Engineering economics., 1997.
- Whitman, David L., and Ronald E. Terry. "Fundamentals of engineering economics and decision analysis."
- Chadderton, Ronald A. Purposeful Engineering Economics. Springer, 2015

Course Evaluation and Development

One of the key priorities in the 2025 Strategy for UNSW is a drive for academic excellence in education. One of the ways of determining how well UNSW is progressing towards this goal is by listening to our own students. Students will be asked to complete the myExperience survey towards the end of this course.

Students can also provide feedback during the semester via: direct contact with the lecturer, the "On-going Student Feedback" link in Moodle, Student-Staff Liaison Committee meetings in schools,

informal feedback conducted by staff, and focus groups. Student opinions really do make a difference. Refer to the Moodle site for this course to see how the feedback from previous students has contributed to the course development.

Important note: *Students are reminded that any feedback provided should be constructive and professional and that they are bound by the Student Code of Conduct Policy*

<https://www.gs.unsw.edu.au/policy/documents/studentcodepolicy.pdf>

Staff Details

| Position | Name | Email | Location | Phone | Availability | Equitable Learning Services Contact | Primary Contact |
|----------|--------------|-------|------------------|-----------|-------------------------------------|-------------------------------------|-----------------|
| Convenor | Milad Ghasri | | 107, building 20 | 5114 5152 | Please email to make an appointment | No | Yes |