GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2025-2026

Engineering Economy (E076951)

Course size *(nominal values; actual values may depend on programme)*

Credits 6.0 **Study time 180 h**

Course offerings in academic year 2025-2026

A (semester 1)	English	Gent
B (semester 1)	Dutch	Gent

Lecturers in academic year 2025-2026

Verbrugge, Sofie	TW05	lecturer-in-charge
Chiha Ep Harbi, Asma	TW05	co-lecturer

Offered in the following programmes in 2025-2026	crdts	offering
Bridging Programme Master of Science in Industrial Engineering and Operations Research(main subject Manufacturing and Supply Chain Engineering)	6	A
Bridging Programme Master of Science in Industrial Engineering and Operations Research(main subject Transport and Mobility Engineering)	6	A
Master of Science in Electrical Engineering (main subject Communication and Information Technology)	6	A
Master of Science in Electromechanical Engineering(main subject Control Engineering and Automation)	6	A
Master of Science in Electromechanical Engineering(main subject Electrical Power Engineering)	6	A
Master of Science in Electrical Engineering (main subject Electronic Circuits and Systems)	6	A
Master of Science in Industrial Engineering and Operations Research(main subject Manufacturing and Supply Chain Engineering)	6	A
Master of Science in Electromechanical Engineering(main subject Maritime Engineering)	6	A
Master of Science in Electromechanical Engineering(main subject Maritime Engineering)	6	A
Master of Science in Electromechanical Engineering(main subject Mechanical Construction)	6	A
Master of Science in Electromechanical Engineering(main subject Mechanical Energy Engineering)	6	A
Master of Science in Industrial Engineering and Operations Research(main subject Sustainable Mobility Analytics)	6	A
Master of Science in Industrial Engineering and Operations Research(main subject Transport and Mobility Engineering)	6	A
International Master of Science in Advanced Design of Sustainable Ships and Offshore Structures	6	A
Master of Science in Chemical Engineering	6	A
Master of Science in Chemical Engineering	6	A
Master of Science in Civil Engineering	6	A
Master of Science in Civil Engineering	6	A
Master of Science in Computer Science Engineering	6	A
Master of Science in Electromechanical Engineering	6	A
Master of Science in Engineering Physics	6	A
Master of Science in Engineering Physics	6	A
Master of Science in Engineering: Ships and Marine Technology	6	A
Master of Science in Engineering: Ships and Marine Technology	6	A
Master of Science in Fire Safety Engineering	6	A
Master of Science in Industrial Engineering and Operations Research	6	B
Master of Science in Materials Engineering	6	A

Master of Science in Mechanical and Electrical Systems Engineering	6	A
Master of Science in Photonics Engineering	6	A
Master of Science in Sustainable Materials Engineering	6	A
Exchange programme in Economics and Business Administration	6	A

Teaching languages

English, Dutch

Keywords

cost accounting
management accounting
investment decisions
managerial decision making
business models
sustainable business models
techno-economic assessment

Position of the course

This course fits in the master's programme in engineering. The aim of the course is to provide students with useful terminology, methodology and practical skills in the domain of engineering economy, based on scientific insights. Eventually, students should be able complement technological projects with an economic analysis in order to assess the techno-economic feasibility of these projects.

Contents

Theoretical part

MODULE 1 - cost and management accounting

- Cost accounting and cost allocation: activity-based costing and time-driven activity based costing, allocation techniques for joint costs
- Cost estimation and cost evolution: unit and factor techniques, economies of scale, learning curve
- Pricing techniques, break even and profitability analysis

MODULE 2 – investment analysis and techno-economic assessment

- Interest and equivalence: Simple Interest and Compound Interest. Nominal and Effective Interest Rates, Equivalence for repeated cash flows
- Investment analysis for a single project, comparison and selection amongst multiple investment projects, mutually exclusive alternatives.
- Replacement Analysis
- Techno-economic assessment

MODULE 3 – advanced investment analysis and techno-economics

- After-tax analysis
- Analysis under uncertainty: Sensitivity and scenario analysis, Monte Carlo simulation
- Flexibility in investment decisions, real options analysis
- Economic Analysis in the Public sector: Benefit–Cost Ratio Method

MODULE 4 – Business models

- Business model and value proposition, Osterwalder canvas
- Business models patterns: long tail, unbundling, multi-sided platform, free and open models
- societal cost-benefit analysis, social return on investment, Sustainable development goals (UN SDGs)

Practical part

- Discussion of realistic cases in interactive case sessions
- Online exercises in order to practice application of main concepts
- Spreadsheet exercises that allow students to learn how to apply the course concepts in practice

Initial competences

- Followed course 'Duurzame bedrijfsvoering' or equivalent.
- Understanding of financial accounting: profit-and-loss calculations
- Basic knowledge of cost accounting concepts: fixed and variable costs, direct and indirect costs

Final competences

1 Perform a cost assessment for a technological product or service
2 Substantiate an investment decision for a technological project, before and after tax
3 Evaluate the impact of risk and uncertainty on an investment decision making process for technological projects
4 Develop a sustainable business model for a technological product or service
5 Develop a spreadsheet model in order to compare different engineering alternatives from an economic perspective
6 Have the attitude to read popularizing texts on economic and business topics. Apply the main concepts from an economic text in an engineering context
7 Understand scientific papers in the domain of management accounting and business modeling

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Seminar, Lecture, Independent work

Extra information on the teaching methods

This course is offered using blended learning principles. The course consists of 4 modules, taken up 3 weeks each. Slides, knowledge clips and learning exercises are offered via electronic learning platform Ufora and studied by the students independently in the first week of every module. In the second week of the module the concepts are applied in realistic case in an interactive case session in class. In the last week of each module there is an exercise and booster session aimed at calculation exercises and highlighting the major concepts and encountered difficulties in this module.

Study material

Type: Handbook

Name: Engineering Economy, global edition
Indicative price: € 60
Optional: yes
Language : English
Author : Sullivan, Wicks and Koelling
ISBN : 129226490X
Number of Pages : 750
Oldest Usable Edition : 6th edition
Online Available : No
Available in the Library : Yes
Available through Student Association : No
Usability and Lifetime within the Course Unit : regularly
Usability and Lifetime within the Study Programme : one-time
Usability and Lifetime after the Study Programme : occasionally

Type: Handouts

Name: Engineering Economy course material
Indicative price: Free or paid by faculty
Optional: no
Language : English
Number of Pages : 300
Available on Ufora : Yes
Online Available : No
Available in the Library : No
Available through Student Association : No
Usability and Lifetime within the Course Unit : intensive
Usability and Lifetime within the Study Programme : one-time
Usability and Lifetime after the Study Programme : occasionally
Additional information: students can print the material but may also decide to keep it purely digital

References

- Alnoor Bhimani, Charles T. Horngren, Srikant Datar, Madhav Rajan, Management

and Cost Accounting, Pearson, 6th edition, 2015, ISBN: 978-1292063461.
- Donald G Newman, Jerome P. Lavelle, Ted G. Eschenbach, Engineering Economic Analysis, Oxford University Press, International 12th edition, 2016, ISBN: 978-0199339280.
- Ronald A. Chadderton, Purposeful Engineering Economics, Springer, 2015, ISBN: 978-3319188478
- Alex Osterwalder, Yves Pigneur, Greg Bernarda, Alan Smith, Value Proposition Design, Wiley, 2014, ISBN: 978-1-118-96805-5
- Alex Osterwalder and Yves Pigneur, Business Model Generation, Wiley, 2010, ISBN: 978-0470-87641-1

Course content-related study coaching

Assessment moments

end-of-term and continuous assessment

Examination methods in case of periodic assessment during the first examination period

Written assessment with multiple-choice questions, Written assessment

Examination methods in case of periodic assessment during the second examination period

Written assessment with multiple-choice questions, Written assessment

Examination methods in case of permanent assessment

Written assessment with multiple-choice questions, Participation

Possibilities of retake in case of permanent assessment

examination during the second examination period is not possible

Extra information on the examination methods

Examination methods in case of continuous evaluation: online quizzes and participation in case sessions.

Calculation of the examination mark

Combination of continuous evaluation (online quizzes and participation in case sessions.) and periodic evaluation (exam).
Continuous evaluation amounts to 30% of the final examination mark. The exam for the remaining 70%. Participation in all course parts is required in order to be able to pass the course.
When calculating the final score after the retake exam, attendance to case sessions is no longer taken into account.

Facilities for Working Students

Case sessions can be replaced by an individual project