DOI-SAP-354 Engineering Economy

SEMESTER: Fall/Spring
CREDITS: 6 ECTS (60 hours)
LANGUAGE: English
DEGREES: SAPIENS program

Course overview

This course introduces the student to the basic concepts of corporate finance, and some elements of Capital Projects, developing further those aspects which are more relevant to engineering.

The course gets deep into the fundamentals of financial management and capital budgeting, by using skills and techniques previously learnt in engineering school.

During the course, students will learn about the time value of money, how to interpret and analyze financial statements, to forecast cash flows, to valuate investment projects, to compromise between risk and return, to make complex economic projections, to prepare budgets and to manage the net-working capital, among other relevant issues.

Prerequisites

Having passed basic courses on Calculus and Algebra for engineers. Recommended: Accounting.

Course contents

Theory / Lectures:

0. Course Introduction, Ethics and Overview of Concepts
1. Making Economic Decisions and Leadership
2. Assets and Liabilities in Engineering Projects
3. Estimating Engineering Costs and Benefits
4. Interest and Equivalence
5. Equivalence for Repeated Cash Flows
6. Present Worth Analysis
7. Annual Cash Flow Analysis
8. Rate of Return Analysis
9. Capital Budgeting: Choosing the Best Alternative
10. Other Analysis Techniques
11. Depreciation
12. Income Taxes for Corporations
13. Economic Life and Replacement Analysis
14. Net Working Capital

15. Inflation and Price Change
16. Project Finance
17. Selection of a Minimum Attractive Rate of Return
18. Risk analysis: Uncertainty in Future Events and Simulation
19. Capital Projects
20. Economic Analysis in the Public Sector
21. Accounting and Engineering Economy
22. Real Estate
23. Creative and Critical Thinking in Engineering Projects
24. Corporate Social Responsibility

Course Project

In addition to lectures there will be individual assignments to help students settle the concepts and ideas learnt in class. Finally, students will present a final project that will include every topic seen throughout the course. The project will be related to the the engineering industry.

Textbooks (Recommended)

- D. G. Newnan, T. G. Eschenbach, J. P. Lavelle, and N. A. Lewis, Engineering Economic Analysis. Oxford University Press, 2019, 14th Edition. ISBN 978-0-19-093191-9
- S. A. Ross, R. W. Westerfield, J. F. Jaffe and B. D. Jordan (2019) Corporate Finance, 12th Edition. International Student Edition – McGraw-Hill. ISBN 978-1-25-991894-0

Grading

The following conditions must be accomplished to pass the course:

- A minimum overall grade of at least 5 over 10.
- A minimum grade on the final exam of 3 over 10.

The overall grade is obtained as follows:

- 10% Midterm Exam
- 30% Final Exam
- 35% Homework and Assignments
- 25% Project

Class attendance is mandatory according to Article 93 of the General Regulations (Reglamento General) of Comillas Pontifical University and Article 6 of the Academic Rules (Normas Academicas) of the ICAI School of Engineering. Not complying with this requirement may have the following consequences:

- Students who fail to attend more than 15% of the lectures may be denied the right to take the final exam during the regular assessment period.

- Students who commit an irregularity in any graded activity will receive a mark of zero in the activity and disciplinary procedure will follow (cf. Article 168 of the General Regulations (Reglamento General) of Comillas Pontifical University). A delay in the delivery of reports will be penalized

The extraordinary call consists of an exam covering the whole subject. The weight of this extraordinary exam could be 40% or 60%. The exam will only count 40% if the homework and assignments (35%) helps the student to get a better overall grade. If these do not improve overall grade, the extraordinary exam will value 60% of the final mark and homework will account for 15%. The final grade will include the 25% of the project.