

Module Title: Cost-Benefit Analysis and Investment Decisions

(Track Compulsory and Track Elective)

- **Type of Module:**

	PC (Prescribed Core Module)
x	PS (Prescribed Stream Module)
x	ES (Elective Stream Module)
	E (Elective Module)

- **Level of Module: Track Course**

- **Year of Study**

4^o (PS1) – 5^o (ES3)

- **Semester**

8^o- 10^o

- **Number of credits allocated**

5

- **Name of lecturer / lecturers :** Professor Georgios Dounias

- **Description:**

An introductory course on the principles of engineering economy in which the basic concepts regarding benefit and cost in both monetary and non-monetary terms are discussed. Students are exposed to managing actual problems, public projects, socio-economic studies, and major private investment decisions. Topic areas include:

- Basic Concepts (Economic Life, Cash-Flow Diagrams, Viewpoint, Mutual Alternatives)
- Interest formulas - Equivalence
- Present Worth, Annual Worth, Incremental Analysis in Investment Decisions
- Bond Evaluation using Present Worth, Benefit-Cost Ratio, Rule of Delta
- Internal Rate of Return, Descartes' Rule, Nostrom's Condition, Bergman's Rule
- Depreciation, Taxation and Inflation in cost-benefit analysis
- Multiple alternatives, Sensitivity Analysis, Capital budgeting
- Socio-economic Studies, International Projects

- **Prerequisites: None**

- **Module Contents (Syllabus):**

ΕΒΔΟΜΑΔΑ	ΠΕΡΙΕΧΟΜΕΝΟ ΜΑΘΗΜΑΤΟΣ
1	➤ Basic Concepts (Cost of Capital, Viewpoint, Types of Investment Decisions, Cash-Flow Diagrams)
2	➤ Equivalence - Interest and Mathematics of Finance - Compound Interest Factor Tables (P/A, P/F, A/F, F/P, A/P, F/A, P/G, A/G)
3	➤ Compound Interest , Interest and Principal Separation, Nominal and Effective

	Rate of Interest, Continuous Compounding
4	➤ Present Worth, Annual Worth, Incremental Analysis
5	➤ Unequal investment horizons and Present Worth, Infinite Investment Horizon, Present Worth and Bond Valuation)
6	➤ 1 ^η Written Test
7	➤ Benefit-Cost Ratio (B/C) Internal Rate of Return (IRR)
8	➤ B/C and Rule of Delta, IRR and Nostrom Condition, 'D escartes' Rule of Signs, Bergmann's Rule, Incremental Analysis in B/C and IRR)
9	➤ 2 ^η Written Test
10	➤ Depreciation and Taxation in Cost-Benefit Studies
11	➤ Inflation - Sensitivity Analysis - Loans
12	➤ Multiple Alternatives - Cost of Capital - Capital Budgeting - Big Projects - Public Projects
13	➤ Non-economic Costs and Benefits - Socio-economic Studies / Feasibility Studies - Consulting Career in Engineering Economy Topics

- **Recommended Reading:**

A) Principal Reference:

The basic text reference for this course is:

G. Dounias and V. Moustakis (2008), **Engineering Economy & Decision Making** , 2nd Edition, Pyxida Editions, (in Greek)

B) Additional References:

Other related references:

- V.S. Moustakis (2013), Practical Guide of Economic Analysis, Tziolas Editions (in Greek)
- Eugene Lodewick Grant, William Grant Ireson, Richard S. Leavenworth, (1982), Principles of engineering economy, 5th Ed., Wiley, USA
- Henry Malcolm Steiner (1996), Engineering Economic Principles, McGraw Hill, USA
- S.K. Karvounis (2006), *Methodology, Techniques and Theory of Feasibility Studies*, Stamoulis Editions

- **Teaching Methods:**

In class teaching, case study discussions

- **Assessment Methods:**

- Final exam 100%
- Two Written Tests (maximum bonus 20%)

- **Language of Instruction:** Greek

Module Objective (preferably expressed in terms of learning outcomes and competences):

- Understanding of basic concepts necessary for elaborating feasibility studies (cash-flow diagram representations, investment horizon, viewpoint of analysis, opportunity cost of capital, taxation, depreciation, inflation)
- Emphasis on the proper use of the four investment criteria for comparing mutual alternatives, under the unified methodological framework of incremental analysis
- Application of the above in solving real-world problems and case studies / analysis of the perspective of an engineering career in the field of consulting



**Department of Financial and
Management Engineering**