



NATIONAL UNIVERSITY OF ENGINEERING
COLLEGE OF INDUSTRIAL AND SYSTEMS ENGINEERING
SYSTEMS ENGINEERING PROGRAM

SYLLABUS - GP234 ECONOMIC ANALYSIS IN ENGINEERING

I. GENERAL INFORMATION

CODE	: GP234
SEMESTER	:
CREDITS	: 3
HOURS PER WEEK	: 4 (Theory – Practice)
PREREQUISITES	: GP203 Macroeconomy, GP223 Financial Accounting
CONDITION	: Elective
INSTRUCTOR	: Daniel Valdivia, Roberto Eyzaguirre
INSTRUCTOR E-MAIL	: danielvc@uni.edu.pe

II. COURSE DESCRIPTION

This course trains students in the application of methods and technique of engineering economics, for decision making in engineering or technical projects assessment. Time concepts, interest rate and equivalence are explained to know how they affect money. Capital cost calculation. Depreciation application. Fund net-flow. VPN, CC, TIR, B/C, VAUE, PRI and PE techniques so students can handle results of the economical assessment. Replacement decision. Selection of independent projects with budget limitations. Engineering application problems are solved and spreadsheet is used.

III. COURSE OUTCOMES

1. Deduce and use engineering economics factors to explain money value through time.
2. Organize and calculate the cost of every capital source.
3. Use depreciation methods allowed by domestic law and study their impact in taxation.
4. Elaborate fund net-flow for its assessment considering the tax effect on income.
5. Apply and compare alternatives based on present value, Internal rate of return, profit-cost ratio, Uniform Annual Value Equivalent.
6. Carry out studies of replacement of an asset or system in use for a new one.
7. Select among independent projects when there is a limit in capital investment.

IV. LEARNING UNITS

1. BASIC CONCEPTS OF ENGINEERING ECONOMICS / 12 HOURS

IE fundamentals / Time, interest rate and equivalence / Simple and combined factors / Equivalent interest rates..

2. CAPITAL COST / 6 HOURS

Concepts / capital sources / Calculation of costs of each source / CPPK calculation / CPPK optimization.

3. DEPRECIATION / 4 HOURS

Concepts and definitions / national legal framework / Depreciation systems / Comparative graphs.

4. FUND NET-FLOW / 4 HOURS

Consideration for the elaboration of the FNF / Structure of a FNF / Elaboration of a FNF..

5. ASSESSMENT TECHNIQUES / 12 HOURS

Present net value / Capitalized cost / Rate of return / Uniform Annual Value Equivalent / Profit-cost / Payback period / Break-even point.

6. REPLACEMENT ANALYSIS / 4 HOURS

Fundamentals / Economic useful life / Applications.

7. ECONOMIC ASSESSMENT WITH BUDGET LIMITATIONS / 6 HOURS

Capital rationing / use of VPN for assessment / techniques for the elaboration of the linear programming model / Applications.

V. LABORATORIES AND PRACTICAL EXPERIENCES

Quiz 1: Application of factors and interest rate in a combined way.

Quiz 2: Calculation of capital cost and fund net-flow.

Quiz 3: Application of assessment techniques.

Quiz 4: Application of the entire linear programming for the solution to budget limitation problems.

Quiz 5: Research paper exposition.

VI. METHODOLOGY

This course is carried out in theory and practical sessions. In theory sessions, the instructor introduces concepts, models and applications. In practical sessions, different problems are solved and their contextualized solutions are analyzed. Students must use electronic sheet and software entire linear programming software. At the end of the course, students must hand over and expose and applicative and integrating paper. In all sessions, students' active participation is encouraged.

VII. EVALUATION FORMULA

The average grade PF is calculated as follows:

$$PF = EP/3 + EF/3 + (PC1 + PC2 + PC3 + TF)/12$$

EP: Mid-Term Exam

EF: Final Exam

PC: Quizzes

TF: Final paper

VIII. BIBLIOGRAPHY

1. **BLANK LELAND AND ANTHONY TARKIN**
Engineering Economics (Spanish)
McGraw Hill, 6th edition (2006)
2. **SULLIVAN, WILLIAM AND ELIN M. WICKS**
Engineering Economics (Spanish)
Prentice Hall editorial (2004)