

ENGINEERING ECONOMICS – PROJECT & OPERATIONS MANAGEMENT

COURSE OUTLINE

(1) GENERAL

SCHOOL	ENGINEERING SCHOOL		
ACADEMIC UNIT	MECHANICAL ENGINEERING DEPARTMENT		
LEVEL OF STUDIES	UNDER GRADUATE		
COURSE CODE	270 604	SEMESTER	6
COURSE TITLE	ENGINEERING ECONOMICS – PROJECT & OPERATIONS MANAGEMENT		
INDEPENDENT TEACHING ACTIVITIES <i>if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits</i>	WEEKLY TEACHING HOURS	CREDITS	
Lectures	2		
Laboratory	2		
Tutorial	2	6 (total)	
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
COURSE TYPE <i>general background, special background, specialised general knowledge, skills development</i>	Specialized Knowledge, skills development		
PREREQUISITE COURSES:	No		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek (official)- English (optional)		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	YES		
COURSE WEBSITE (URL)	http://ikaros.teipir.gr/OPS/engecon_en.html		

(2) LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area
- Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B
- Guidelines for writing Learning Outcomes

Upon completion of the course, students will:

- Have acquired a very wide and useful knowledge and experience on the operation, economic analysis, feasibility and evaluation of enterprises and projects
- They will be familiar with the methods and tools for Project Management.
- They will understand the principles of the development and operation of an enterprise and be familiar with the business environment.
- They will be able to make an economic analysis of an investment and employ concepts such as cash-flows, interests' rates, evaluation criteria, like Simple PayBack Period, Rate-on-Return, Net Present Value, Break-Even Analysis, all these, with special application on the design and operation of engineering projects.
- They will be able to use methods for the business assessment, by reading and explaining balance sheets and Profit and Loss Accounts
- They will use the organisation of a project according to the Project Management principles, the basic network design principles, of Critical Path Method (CPM)
- They will be provided with special skills on organising, planning and controlling a wide variety of technical plans.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	Project planning and management
Adapting to new situations	Respect for difference and multiculturalism
Decision-making	Respect for the natural environment
Working independently	Showing social, professional and ethical responsibility and sensitivity to gender issues
Team work	Criticism and self-criticism
Working in an international environment	Production of free, creative and inductive thinking
Working in an interdisciplinary environment
Production of new research ideas	Others...

Search for, analysis and synthesis of data and information, with the use of the necessary technology concerning the engineering economics, the investment evaluation and the project management
Adapting to new situations since the students acquire knowledge for technologies and projects they have never heard before.

Decision-making for the selection of the most appropriate criteria, methods and tools

Working independently as well as in teams for the completion of the Laboratory's Assignments

Production of free, creative and inductive thinking in the accomplishment of the relevant assigned projects.

(3) SYLLABUS

- Part A: Operations Management
- Introduction to Operations Management.
- Various Legal Schemes for Enterprises.
- Differences between Enterprises and Organisations.
- Business Funding.

- Enterprises Siting.
- Organisational Schemes.
- Basic Economic figures for Enterprises.
- Part B: Engineering Economics
- Basic Concepts - Business Plans - Feasibility Studies
- Basic concepts of Engineering Economics- Business Plans - Feasibility studies.
- Scope, objectives and contents.
- Cost Analysis
- Cost significance, basic cost categories. Direct and indirect costs, fixed and variable costs. The definition and implementation of Break-Even Point. Sensitivity Analysis in Break-Even Calculations.
- Production cost, maintenance cost. Fixed investment cost and working capital. Methods and principles in depreciation. Estimation of production cost in an industrial facility. Examples.
- Investments' Evaluation
- The significance of cash flow. The time value of money. Basic criteria in investments' evaluation.
- The PayBack Period (PBP), Return on Investment (ROI), Net Present Value (NPV) and Internal Rate of Return (IRR) and assorted drawbacks. Implementation issues.
- Implementation and examples in the implementation of NPV, IRR, PBP, ROI.
- Practical examples in investment evaluation in the field of mechanical engineering.
- Financial Analysis of Enterprises
- Reading and explaining balance sheets and Profit and Loss Accounts. The basic points for an engineering assessment. Basic financial indices, concepts and implementation issues.

- Part C: Project Management
- Basic Concepts in Project Management - The development of Project Network
- Project Definition and basic parameters. Projects examples from various production sectors.
- Events and Activities in a Project.
- Basic concepts of Network Analysis.
- The construction of Project Network.
- The Critical Path Method. Critical Path and Critical Activities.
- Earliest, Latest and Floating Times.
- Project design and planning
- Basic Concepts in Project Management. The Significance of the WBS (Work BreakDown Structure). Examples in complex projects.
- Project Planning and Scheduling.
- Decreasing the total duration of the project. Financial implications.
- Project staffing
- The PERT technique
- Case studies
- Organisation, planning and control of various projects (case-studies).
- The use of Project Management Software for project planning and control.

(4) TEACHING and LEARNING METHODS - EVALUATION

<p style="text-align: center;">DELIVERY</p> <p style="text-align: center;"><i>Face-to-face, Distance learning, etc.</i></p>	Lectures, laboratories	
<p style="text-align: center;">USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</p> <p style="text-align: center;"><i>Use of ICT in teaching, laboratory education, communication with students</i></p>	The Module is offered as A= class in the Open Academic Courses with videos from lectures	
<p style="text-align: center;">TEACHING METHODS</p> <p><i>The manner and methods of teaching are described in detail.</i></p> <p><i>Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.</i></p> <p><i>The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS</i></p>	Activity	Semester workload
	Lectures	26
	Tutorial	26
	Laboratory	26
	Case studies	39
	Study	33
	Course total	150
<p style="text-align: center;">STUDENT PERFORMANCE EVALUATION</p> <p><i>Description of the evaluation procedure</i></p> <p><i>Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other</i></p> <p><i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i></p>	<p>Lectures, Visits to companies, Case Studies and Seminars, Use of Software Tools</p> <p>Written examination, Case Studies and Micro-Projects</p> <p>Team Work for Analysis of Business</p> <p>Written examination: 60%</p> <p>Laboratory exercise: 40%</p>	

(5) ATTACHED BIBLIOGRAPHY

<ol style="list-style-type: none"> 1. Burke R.: Project Management Planning and Control. John Wiley, 1993 2. Lewis J.: Fundamentals on Project management. AMACOM 2002 3. Burton V.: Project Management: Methods and Studies. North-Holland, Amsterdam, 1985 4. Kerzner H.: Project Management: A Systems Approach to Planning, Scheduling and Control. Van Norstrand Reinhold, N.York, 1989 5. Peters and Timmerhaus: Plant Design and Economics for Engineers, McGraw-Hill. 6. Stewart, Wyskida, Johannes: Cost Estimator's Reference Manual, J. Wiley, 2nd Edition
