COURSE OUTLINE

1. GENERAL INFORMATION

SCHOOL	MARITIME AND INDUSTRIAL STUDIES		
DEPARTMENT	INDUSTRIAL MANAGEMENT AND TECHNOLOGY		
LEVEL OF STUDY	UNDERGRADUATE		
COURSE UNIT CODE	TEOIK61	**SEMESTER OF STUDY**	6th
COURSE TITLE	ENGINEERING ECONOMICS		
INDEPENDENT TEACHING ACTIVITIES *in case in which credits are awarded for separate components/parts of the course, e.g. in lectures, laboratory exercises, etc. If credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*		**WEEKLY TEACHING HOURS**	**CREDITS**
	Lectures	4	5.5
Add rows if necessary. The organization of teaching and the teaching methods used are described in detail at section 4.			
COURSE TYPE *general background, special background, specialized general knowledge, skills development*	Special background		
PREREQUISITE COURSES:	None		
LANGUAGE OF INSTRUCTION and EXAMINATION/ASSESSMENT:	Greek		
THE COURSE IS OFFERED TO ERASMUS STUDENTS	No		
COURSE WEBSITE (URL)	https://eclass.unipi.gr/courses/BDT108/		

2. LEARNING OUTCOMES

LEARNING OUTCOMES

The course learning outcomes, specific knowledge, skills and competences of an appropriate (certain) level, which students will acquire upon successful completion of the course, are described in detail. It is necessary to consult:

APPENDIX A

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

This course deals with the main techno-economic parameters which affect the viability of a technological system (technological change, technology diffusion, learning, etc.) and analyzes methodologies and economic decision-making tools.

Upon successful completion of the course, the students will be able to:

- Recognize the principles of Engineering Economics and identify the critical techno-economic parameters of a system
- Evaluate the economic viability of a system
- Choose the best alternatives for their companies and organizations
- Depending on their position in a company, develop well documented recommendations or make informed decisions regarding the aforementioned issues

General Competences

Taking into consideration the general competences that students/graduates must acquire (as those are described in the

Diploma Supplement and are mentioned below), at which of the following does the course attendance aims

Search for, analysis and synthesis of data and information, by the use of technologies that are necessary according the case	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Environmental awareness*
Independent work	*Social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Critical consciousness, criticism and self-criticism*
Working in an international environment	*Development of free, creative and inductive thinking*
Working in an interdisciplinary environment	
Introduction of innovative research	

- Search for, analysis and synthesis of data and information, by the use of technologies that are necessary according the case
- Adapting to new situations
- Decision-making
- Independent work
- Project planning and management
- Social, professional and ethical responsibility and sensitivity to gender issues
- Critical consciousness, criticism and self-criticism
- Development of free, creative and inductive thinking

2. COURSE CONTENT

The course covers the following topics:

- Introduction to Engineering Economics: Introductory concepts (Economic Science, Technology, System) –Building of a systemic problem –Reporting System Identification – System boundaries specification
- Technology: Technological Feasibility –Financial Sustainability –Financial Capability –Capital Cost –Operating Cost –Levelised cost
- System Analysis: Production Function sand Technology -Marginal Productivity and Technology -Economies of Scale -Cost Functions -Technological Substitution
- Feasibility Assessment: Criteria and Evaluation Indicators -Net Present Value (NPV) -Annual Equivalent Worth (EAW)-Criterion of Return on Investment Capital (ROIC) -Criterion of the benefit to cost ratio (BCR) –Comparison of alternatives-Sensitivity analysis -Case studies
- Techno-economic Decision and Support Tools: Analysis of "break even" point -Determination of weighted energy costs -Decision Trees -Sensitivity Analysis -Case studies
- Technique vs Technology: Technological Change (Importance -impact) -Innovation -Research and Development (Features -Effects)
- Technology Evolution -Diffusion: Technological paths- Technological opportunities -Technology diffusion-Technology diffusion curve -Technology development phases –Case Studies -Workshop
- Technology Learning: Technology cost evolution -Technology value evolution -Technology learning curves -Technology transfer Technology forwarding-Case Studies -Workshop
- Technological Change Impact: Business cycles -Technological change and industries -Technological change and businesses -Competitiveness -Exercises

Also, case studies from the following bibliography are presented:

- Donald G. Newnan, Ted G. Eschenbach, Jerome P. Lavelle, Engineering Economic Analysis, Oxford University Press, 2004.
- Chan S. Park, Fundamentals of Engineering Economics, Pearson Education, 2004.
- Adedeji B. Badiru & Olufemi A. Omitaomu, Computational Economic Analysis for Engineering and Industry, CRC Press, Taylor & Francis Group, 2007.
- H. G. Thuesen, W. J. Fabrycky, G. J. Thuesen, Engineering Economy, Prentice-Hall, Inc., 5th Edition, 1977.

In addition, articles, audiovisual lecture material, web addresses, useful information, exercises and/or are posted at eclass.

3. TEACHING METHODS - ASSESSMENT

TEACHING MODE *Face-to-face, in-class lecturing, on distance teaching and distance learning etc.*	In-class lecturing
USE OF INFORMATION AND COMMUNICATION TECHNOLOGY *Use of ICT in Teaching, Laboratory Education, Communication with students*	**Teaching:** Lectures with audiovisual media, support of the learning process through the eclass platform **Communication with students:** face-to-face at office hours, email, eclass
COURSE DESIGN *Description of teaching techniques, practices and methods:* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, clinical practice, Art Workshop, Interactive teaching, Educational visits, project, Essay writing, Artistic creativity, etc.* *The study hours for each learning activity as well as the hours of non- directed study are given according to the principles of the ECTS*	

Activity / Method	***Semester Workload***
Lectures	52
Case studies/exercises	26
Self-study of lecture material and exercises	57
Counselling	0.5
Exams (written)	2
Course Total	***137.5***

STUDENT PERFORMANCE EVALUATION/ASSESSMENT METHODS *Detailed description of the evaluation procedures:* *Language of evaluation, assessment methods, formative or summative (conclusive), multiple choice questionnaires, short- answer questions, open-ended questions, problem solving, written work, Essay/report, oral exam, public presentation, laboratory work, art interpretation, other……etc* *Evaluation criteria are specifically defined and given as well as if and where they are reported and accessible to students.*	**Language of exams:** Greek **Assessment Methods:** After the last lecture, the exam material is posted at eclass. The final course grade is formed by the written exams (100%) taken in the examination period of the spring semester and, in case of failure, in the September resits. The written examination includes problem solving/exercises and short-answer questions. It is conducted with closed books. Students may use notes with the mathematical expressions. The evaluation of students with special learning difficulties in writing and reading (as certified and qualified by a competent institution) is performed according to the relevant procedure decided by the Department Assembly. **Notification of the Assessment Criteria:** The evaluation criteria are made known during the first lecture and are clearly stated on the course website and e-class. The answers to the exam questions are posted at eclass after the exam date. Students have the opportunity to discuss their exam paper with the course instructor (at the posted office hours) after the announcement of the course grades.

4. SUGGESTED BIBLIOGRAPHY

-Suggested Bibliography :

- Book [1765]: Systemic Methodology & Engineering Economics [in Greek], Panagiotakolpoulos D.
- Book [31900]: Economics of Technology [in Greek], Vernardakis N.

-Scientific Journals: not applicable

-Lecture Notes