COURSE OUTLINE

1. GENERAL INFORMATION

SCHOOL	MARITIME AND INDUSTRIAL STUDIES		
DEPARTMENT	INDUSTRIAL MANAGEMENT AND TECHNOLOGY		
LEVEL OF STUDY	UNDERGRADUATE		
COURSE UNIT CODE	TETEX01	**SEMESTER OF STUDY**	7th
COURSE TITLE	ENERGY TECHNOLOGIES AND THE ENVIRONMENT		

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/BDT122 /

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*

The energy system includes the infrastructure for the conversion of primary energy sources into energy forms that can be transferred, distributed, stored and utilized by the end used. The most important elements of an energy system relate with its infrastructure, size and structure of its subsectors as well as the type and use of different energy forms in it. In the above framework, this course presents the structure of the energy system, the parameters that affect its evolution and basic approaches of evaluating its "quality".

Aim of the course is to develop the appropriate knowledge base that will allow graduates to:

- Identify potential opportunities of green economy (improvement of the efficiency of conventional systems, exploitation of renewable energy, energy policy instruments)
- Evaluate them
- Choose the best options for their companies and organizations
- Develop well documented recommendations or take informed decisions(depending on their position)regarding the above mentioned 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
Adapting to new situations
Decision-making
Independent work
Team work
Working in an international environment
Working in an interdisciplinary environment
Introduction of innovative research
Project planning and management
Respect for difference and multiculturalism
Environmental awareness
Social, professional and ethical responsibility and sensitivity to gender issues
Critical consciousness, criticism and self-criticism
Development of free, creative and inductive thinking

- Search for, analysis and synthesis of data and information, by the use of technologies that are necessary according the case
- Adapting to new situations
- Independent work
- 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:

- Energy system, energy problem, security of energy supply, techno-economics of energy systems, energy analysis of systems
- Production and use of fossil fuels energy, technical characteristics of the systems
- Electrical economy
- Basic parameters of the exploitation of renewable energy sources (RES), wind energy, solar energy, hydro-energy
- Critical environmental issues, limiting greenhouse gas emissions policy
- Case studies

Also, case studies from the following bibliography are presented:

- Hodge, B., K., Alternative Energy Systems and Applications, John Wiley & Sons, 2010.
- Martin Kaltschmitt, Wolfgang Streicher, Andreas Wiese, Renewable Energy, Technology, Economics and Environment. Springer-Verlag Berlin Heidelberg, 2007.
- Shepherd W. and Shepherd D.W., Energy Studies, Imperial College Press, London, 1998.
- Goldberg J., Energy, Environment & Development, Earthscan, U.K., 1996.
- Eastop T.D. and Croft D.R., Energy Efficiency, Longman, U.K., 1996.
- Schipper L. and Meyers S., Energy Efficiency and Human Activity, Cambridge Univ. Press, Cambridge, 1995.
- I.K. Kaldelis, K.A. Kavadias, Computational Applications of Mild Energy [in Greek], 2005.
- K.C. Lefa, Introduction in Natural Gas Technology [in Greek], 1994.
- C.A. Fragopoulos, I.P. Karidogiannis, G.K. Karalis, Cogeneration of Heat and Electricity [in Greek], 1994.
- Rubin E., Introduction to Engineering & the Environment, McGraw-Hill, 2001.
- Godfrey Boyle, Bob Everett and Janet Ramage, Energy Systems & Sustainability – Power for a Sustainable Future, Oxford University Press, 2004.
- V.D. Bitzionis, D.V. Bitzionis, Alternative Energy Forms [in Greek], 2010.

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

3. TEACHING METHODS - ASSESSMENT

<table>
<tr><td>TEACHING MODE
Face-to-face, in-class lecturing, on distance teaching and distance learning etc.</td><td>In-class lecturing</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATION TECHNOLOGY
Use of ICT in Teaching, Laboratory Education, Communication with students</td><td>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</td></tr>
<tr><td>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</td><td>
<table>
<tr><th>Activity / Method</th><th>Semester Workload</th></tr>
<tr><td>Lectures</td><td>52</td></tr>
<tr><td>Case studies / exercises</td><td>26</td></tr>
<tr><td>Self-study of lecture material and exercises</td><td>57</td></tr>
<tr><td>Counselling</td><td>0.5</td></tr>
<tr><td>Exams (written)</td><td>2</td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td>Course Total</td><td>137.5</td></tr>
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</td></tr>
<tr><td>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.</td><td>Language of exams: Greek / English (in ERASMUS class)

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 winter semester and, in case of failure, in the September resits

The written examination includes problem solving/exercises, short-answer and open-ended questions. It is conducted with closed books. Students may use a note with 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.</td></tr>
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4. SUGGESTED BIBLIOGRAPHY

-Suggested Bibliography :

- Book [41963205]: Renewable Energy Sources [in Greek], Asimakopoulos D., Arampatzis G., Aggelis-Dimakis A., Kartalidis A., Tsiligiridis G.
- Book [22770910]: Renewable Energy Sources [in Greek], Tsoutsos Th., Kanakis I.
- Book [41958303]: Policy Decisions Models in Energy and Environmental Systems [in Greek], Doukas C., Psaras I.

-Scientific Journals: not applicable
-Lecture Notes