COURSE OUTLINE

1. GENERAL INFORMATION

SCHOOL	MARITIME AND INDUSTRIAL STUDIES		
DEPARTMENT	INDUSTRIAL MANAGEMENT AND TECHNOLOGY		
LEVEL OF STUDY	UNDERGRADUATE		
COURSE UNIT CODE	TEMEB01	**SEMESTER OF STUDY**	8th
COURSE TITLE	ENERGY TRANSITION AND SUSTAINABILITY (ELECTIVE COURSE)		

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	6	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*	Specialized general knowledge, Skills development
PREREQUISITE COURSES:	Typically, there are no prerequisites. Desirable but not necessary: Understanding of energy systems, basic knowledge of energy policy.
LANGUAGE OF INSTRUCTION and EXAMINATION/ASSESSMENT:	Greek
THE COURSE IS OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	https://eclass.unipi.gr/courses/BDT321/

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 course approaches the energy transition from multiple perspectives to explore the opportunities and challenges of different transition strategies toward sustainable energy development. The goal is to enable students to identify and explain the unintended consequences of energy transitions, as well as possible ways to address them towards a sustainable and just energy transition. Indicative topics include: changes in supply and demand matching, improvement of living conditions for building occupants, equitable distribution of just transition benefits, new business model in the electricity market, etc. To achieve these objectives, the course will include hands-on Excel-based courses, where students will be tasked to identify the challenges and opportunities presented by various transition strategies, and explores solutions towards sustainability, social justice, and reduced environmental impact. With this approach, students will develop decision-making skills under uncertainty, preparing them to become valuable professionals in businesses and policymaking organizations.

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
- Decision-making
- Independent work
- Working in an interdisciplinary environment
- Introduction of innovative research
- Project planning and management
- Environmental awareness
- Development of free, creative and inductive thinking

2. COURSE CONTENT

The course covers the following topics:

Lectures:

- Basic principles of energy system analysis (technologies, sectors, and impacts)
- Definition of energy transition – the need for energy transition
- The European strategy toward green energy
- Energy transition – challenges and opportunities
- The variability of renewable energy production
- Self-consumption models
- Energy storage systems and related business models
- The building sector as a driver of energy transition
- The Smart Readiness Indicator (SRI) for buildings
- Modern business models arising with the energy transition (e-mobility, dynamic pricing, smart energy management, etc.)

Laboratory:
Lectures are supported by simple computational problems that students will study using Excel. This approach enhances the quantification of theoretical concepts covered in class. Furthermore, the course includes periodic assignments, providing an environment where students can apply their knowledge to real-world challenges related to the energy transition.

eClass will serve as a dynamic learning support resource. It will host scientific articles, audio-visual material from lectures, and other useful resources. Students will have access to case studies and exercises, allowing them to further practice and deepen their understanding on the course's concepts.

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 / Laboratory teaching</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.
Laboratory Education: Use of commercial software
Communication with students:
face-to-face at office hours:
Monday & Thursday 10:00-18:00 (following an appointment)
email: michas@unipi.gr
e-class</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>Laboratory case studies</td><td>26</td></tr><tr><td>Self-study of lecture material and exercises</td><td>26</td></tr><tr><td>Exercises/Assignments</td><td>39</td></tr><tr><td>Presentations</td><td>8</td></tr><tr><td>Counselling</td><td>6</td></tr><tr><td>Exams (written)</td><td>2</td></tr><tr><td>Course Total</td><td>159</td></tr></table></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

Assessment Methods: The final course grade is determined as follows:
50% from the final exams.
50% from the implementation and presentation of assignments.
A minimum score of 40% in the final exam and 40% in the assignments is required to pass the course. Assignment topics and evaluation criteria will be posted on eClass throughout the semester.

In case of failure or non-submission of assignments, during the September exam period, the course grade will be determined based on the reimplementation and presentation of assignments.

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. 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 :

- **Αειφόρος Ανάπτυξη, περιβάλλον και ενέργεια (2nd edition)**
  Authors: Καρκαλάκος Σωτήρης, Πολέμης Μιχάλης
  Publisher: ΤΣΟΤΡΑΣ ΑΘΑΝΑΣΙΟΣ Ε.Ε.
  Eudoxus code: 112706535
- **Οικονομικά της ενέργειας και ενεργειακό σύστημα**
  Authors: Bradford T.
  Publisher: ΕΚΔΟΣΕΙΣ ΠΑΠΑΖΗΣΗ
  Eudoxus code: 102124391

-Scientific Journals:

- Applied Energy
- Energy
- Energy Policy
- Renewable and Sustainable Energy Transition

- Lecture Notes
- e-class