COURSE OUTLINE

1. GENERAL INFORMATION

SCHOOL	MARITIME AND INDUSTRIAL STUDIES		
DEPARTMENT	INDUSTRIAL MANAGEMENT AND TECHNOLOGY		
LEVEL OF STUDY	UNDERGRADUATE		
COURSE UNIT CODE	ΤΕΠΑΡ25-2	**SEMESTER OF STUDY**	3rd
COURSE TITLE	PROCESSES II		
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/BDT238/		

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 aims to familiarize students with the basic concepts of unit operations involved in the production of goods. Special emphasis is given in fluid mechanics, thermodynamics and energy and mass balance.

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

- Solve mass balance problems in basic operations
- Solve energy balance problems in basic operations
- Compose the sequence of industrial unit processes used in the production of goods
- Solve material balance problems at steady state conditions in integrated industrial sub-systems
- Handle adequately fluid mechanics and thermodynamics 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
- Independent work
- Project planning and management
- Social, professional and ethical responsibility and sensitivity to gender issues

2. COURSE CONTENT

The course includes two sections.

Section A΄: Fluid Mechanics and Thermodynamics

Week	Topics
1st	Fluid flow in pipes
2nd	Pump function and characteristics
3rd	Elements of engineering thermodynamics
4th	Industrial applications
5th	Heat exchangers
6th	Analysis of physical systems based on economic, technical and energy criteria
7th	Energy conservation equations
8th	Dimensional analysis
9th	Problems on pipe flow
10th	Problems on pumps and pump function
11th	Problems on Heat exchangers
12th	Review exercises
13th	Review exercises

Section B΄: Unit operations and Mass Balance

Week	Topics
1st	Mass conservation equations
2nd	Basic unit operations: distillation
3rd	Basic unit operations : Extraction and Filtration
4th	Basic unit operations: Evaporation - Drying
5th	Basic unit operations: Concentration
6th	Basic unit operations: Sedimentation
7th	Basic unit operations: Crystallization
8th	Basic unit operations: Adsorption – Absorption
9th	Basic unit operations: Size reduction and mechanical separation
10th	Storage and handling of solid materials
11th	Complex industrial processes
12th	Balance of materials at steady state conditions
13th	Review exercises

In addition, articles, audiovisual lecture material, web addresses, useful information and exercises 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
Study of exercises	26
Self-study of lecture material	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 project (40%) and by the written exams (60%) 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. It is conducted with open books. 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 [50655948]: Basic Processes of Chemical Engineering, 7th Edition [in Greek], McCabe-Smith-Harriott

- Book [18549017]: Elements of Unit operations [in Greek], A. Zoumboulis, Th. Karapantsios, K. Matis, P. Mavros

-Scientific Journals: not applicable

-Lecture Notes