COURSE OUTLINE

1. GENERAL INFORMATION

SCHOOL	MARITIME AND INDUSTRIAL STUDIES		
DEPARTMENT	INDUSTRIAL MANAGEMENT AND TECHNOLOGY		
LEVEL OF STUDY	UNDERGRADUATE		
COURSE UNIT CODE	TETEX08	**SEMESTER OF STUDY**	2nd
COURSE TITLE	INDUSTRIAL TECHNOLOGY LABORATORY		

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**
Laboratory exercises and project	3	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*	Scientific background / Skills development
PREREQUISITE COURSES:	None
LANGUAGE OF INSTRUCTION and EXAMINATION/ASSESSMENT:	Greek
THE COURSE IS OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

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 involves laboratory practice as a continuation of the 1st course on Introduction to Physical Sciences. Its main goal is to familiarize students with scientific and research methodology. In the lab, students become familiar with the experimental and computational simulation of representative topics of modern industrial production.

The course is conducted in the Laboratory of Simulation of Industrial Processes. In particular, the course seeks to familiarize students with: (a) the basic principles of experimental design, (b) the basic principles and calculations in chemical engineering, (c) the modeling of industrial processes, (d) the methods of determining critical parameters of physical and chemical processes for modeling; (e) simulation (physical and computational) and processing of results; (f) modeling, validation and modification of models using experimental results, (g) decision-making based on techno-economic criteria.

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

- Use the basic principles of chemical thermodynamics and kinetics to describe systems

and solve problems
- Understand the concept of chemical equilibrium and solve related problems
- Describe systems of unit operations and unit processes and use basic methods (computational and physical simulation) to study them
- Use models for basic industrial processes
- Process experimental results and use them to configure, validate and modify models
- Use techno-economic criteria for decision making

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
- Team work
- Respect for difference and multiculturalism
- Social, professional and ethical responsibility and sensitivity to gender issues

2. COURSE CONTENT

The Laboratory Syllabus is as follows:

Week	Laboratory Syllabus
1	Introduction to experiments: experimental design, processing of results, models
2	Measurement of the calorific value of biomass products
3	Optimization of batch adsorption
4	Electrochemical recovery of metals– Plating
5	Wastewater quality control and neutralization
6	Optimization of drying
7	Optimization of filtration
8	Corrosion and material maintenance
9	Kinetics - Catalysis and Energy Optimization
10	Balance and Economic Optimization
11	Optimization of aluminium anodization
12	Re-scheduled lab practice
13	Revision exercises

Students also attend a laboratory training program in the Laboratory of Simulation of Industrial Processes. Students attend the laboratory exercises in groups and submit a report for each exercise. The software used is MS EXCEL or equivalent (Open Office, etc.) as well as in house software. Students are trained in workshops with a rotation system. The laboratory program is posted on the course website and at eclass at the beginning of the semester.

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>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: demonstration of the experimental process, presentation/illustration of the theoretical basis and methodology of the laboratory exercises, support of the learning process through the electronic platform eclass
Laboratory Education: Use of open access and in-house software for laboratory exercises
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>Laboratories</td><td>39</td></tr>
<tr><td>Reports</td><td>10</td></tr>
<tr><td>Self-study of laboratory material</td><td>12</td></tr>
<tr><td>Counselling</td><td>0.5</td></tr>
<tr><td>Exams (written)</td><td>1</td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td>Course Total</td><td>62.5</td></tr>
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<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 course material is posted at eclass during the semester. After the last lecture, the exam material is posted at eclass.

Students must attend at least 70% of the laboratories and submit 50% of the laboratory reports. Students may submit reports only after attending the relevant laboratory exercises.

The final course grade is formed as follows:
• 20% by the participation of students in course activities
• 40% by the elaboration of individual project (reports)
• 40% by written exams
In case of failure, in the September re-sits, the course grade is formed by the grade received by the students in the laboratory reports (40%) and by the written examination (60%).

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</td></tr>
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	clearly stated on the course website and e-class. The reports are submitted electronically and the students are informed about the grade they received (with the relevant justification). 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 : not applicable
-Scientific Journals: not applicable
-Laboratory Workbook