

COURSE OUTLINE

1. GENERAL INFORMATION

SCHOOL	MARITIME AND INDUSTRIAL STUDIES		
DEPARTMENT	INDUSTRIAL MANAGEMENT AND TECHNOLOGY		
LEVEL OF STUDY	UNDERGRADUATE		
COURSE UNIT CODE	TEΠΑΡ02-1	SEMESTER OF STUDY	4 th
COURSE TITLE	CHEMICAL INDUSTRIES II		
INDEPENDENT TEACHING ACTIVITIES <i>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</i>		WEEKLY TEACHING HOURS	CREDITS
Lectures		4	5.5
<i>Add rows if necessary. The organization of teaching and the teaching methods used are described in detail at section 4.</i>			
COURSE TYPE <i>general background, special background, specialized general knowledge, skills development</i>	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/BDT230/		

2. LEARNING OUTCOMES

<p>LEARNING OUTCOMES</p> <p><i>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:</i></p> <p>APPENDIX A</p> <ul style="list-style-type: none"> • <i>Description of the level of learning outcomes for each qualifications' cycle, according to the European Higher Education Area's Qualification Framework.</i> • <i>Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and APPENDIX B</i> • <i>Guidelines for writing Learning Outcomes</i>
<p>The course completes the 2nd semester course on "Chemical Industries I" with processes and products of the organic industrial branches. The course is presented in two sections. Section A' includes: coal, hydrocarbons, petroleum products, petrochemicals, polymers, textiles, dyes and explosives. Section B' includes: pharmaceutical products, biomolecules, fats, oils, soap, food and alcoholic beverages.</p> <p>Case studies focus on topics of (a) chemical technology and flow charts (b) process operating parameters that influence the quality and properties of the final products, (c) water and materials saving, (d) industrial by-product exploitation and recycling, (e) environmental emissions.</p> <p>Upon successful completion of the course, the students will be able to:</p> <ul style="list-style-type: none"> • Demonstrate knowledge on the basic chemical technology concepts of industrial production of broad-use organic materials/products • Use the methods presented for solving problems in organic systems • Demonstrate knowledge on design and operational parameters of organic industry

- Design processes for the industrial production of organic materials/products
- Handle the methods used in the determination of techno-economic production parameters for yielding products conforming to the required specifications

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
- 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

2. COURSE CONTENT

The course includes the following topics:

Section A': coal & oil technology – petrochemical technology – polymer technology – textile industry – dye industry – explosives

Section B': pharmaceutical industry – fats, oils and soap industry – wines and beverages παραγωγή οίνων και αλκοολικών ποτών – βιομηχανία ζάχαρης.

The program is presented below in detail:

Section A

Wk	Topics
1	Coal technology
2	Petroleum technology
3	Petrochemicals technology
4	Polymer technology <ul style="list-style-type: none"> ▪ <i>Case study: Specific applications of polymer technology</i>
5	Refineries
6	Production of fuels <ul style="list-style-type: none"> ▪ <i>Case study: Co-production and exploitation of products and by-products</i>
7	Specific applications of hydrogen reforming
8	Oil desulfurization
9	Specific applications of oil desulfurization
10	Textiles: raw materials, production methods, product quality

11	Dyes: raw materials, production methods, product quality ▪ <i>Case study: Effect of raw materials on the final product quality</i>
12	Production of explosives: production methods
13	Review exercises

Section B

Wk	Topics
1	Pharmaceutical industry ▪ <i>Case study: Preparation of combination proprietary drugs and complex formulations – The mixing problem</i>
2	Manufacturing of active substances ▪ <i>Case studies: analgesics, antibiotics, antivirals</i>
3	Pigments, flavors and preservatives industry ▪ <i>Problem sets: production of chloroform, aniline and benzaldehyde</i>
4	Fats, oils, and soap industry: traditional and και modern technology
5	Saponification: product separation and glycerin content of the final product ▪ <i>Case study: Vertically integrated manufacturing of soaps and detergents</i>
6	Hydrogenated fats and margarine production
7	Co-production and exploitation of products and by-products ▪ <i>Case study: Cost minimization of co-production in hydrogenated fats and soap unit</i>
8	Production of wine and alcoholic beverages
9	Spirits quality, acidity and control of volatiles ▪ <i>Problem sets: Effect of raw material on wine quality</i>
10	Horizontal integration: wine, vinegar and aldehyde production
11	Sugar industry ▪ <i>Case study: Quantitative composition of waste and by-products in sugar production</i>
12	Techniques and design in food industry
13	Review exercises

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

3. TEACHING METHODS - ASSESSMENT

TEACHING MODE <i>Face-to-face, in-class lecturing, on distance teaching and distance learning etc.</i>	In-class lecturing	
USE OF INFORMATION AND COMMUNICATION TECHNOLOGY <i>Use of ICT in Teaching, Laboratory Education, Communication with students</i>	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 <i>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.</i>	Activity / Method	Semester Workload
<i>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</i>	Lectures	52
	Study of bibliography	26
	Self-study of lecture material	57
	Counselling	0.5
	Exams (written)	2
	Course Total	137.5

<p>STUDENT PERFORMANCE EVALUATION/ASSESSMENT METHODS</p> <p><i>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</i></p> <p><i>Evaluation criteria are specifically defined and given as well as if and where they are reported and accessible to students.</i></p>	<p>Language of exams: Greek</p> <p>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.</p> <p>The written examination includes problem solving / exercises. It is conducted with open books.</p> <p>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.</p> <p>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.</p>
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4. SUGGESTED BIBLIOGRAPHY

<p><i>-Suggested Bibliography :</i></p> <ul style="list-style-type: none"> • Book [1945]: Industrial Organic Chemistry [in Greek], S. Pegiadou-Koemtzopoulou, E. Tsatsaroni, I. Elefderiadid • Book [68398900]: Analysis of Technology Systems and Process Industrial Branches [in Greek], S. Karvounis <p><i>-Scientific Journals:</i></p> <ul style="list-style-type: none"> • Journal of Drug Development • Industrial Crops and Products • Journal of Cleaner Production • Biomass and Bioenergy • International Journal of Oil, Gas and Coal technology <p><i>-Lecture Notes</i></p>
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