ETY409 - Units Operation Engineering

COURSE OUTLINE

(1) GENERAL

SCHOOL	SCHOOL OF ENGINEERING		
ACADEMIC UNIT	DEPARTMENT OF MATERIALS SCIENCE AND ENGINEERING		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	ETY409	**SEMESTER**	4
COURSE TITLE	Units Operation Engineering		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
Lectures	4	4
Add rows if necessary. The organization of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialized general knowledge, skills development*	Special background
PREREQUISITE COURSES:	NO
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	GREEK
IS THE COURSE OFFERED TO ERASMUS STUDENTS	YES (IN ENGLISH)
COURSE WEBSITE (URL)	

(2) LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.
Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Lectures, aiming to make undergraduate students familiar with basic principles of Unit Operation as well as with the analysis and design of such units, are offered during this course. At the end of this course the student will possess the background knowledge for unit operation problems solving. By completing this course, the students are expected to have acquired the following:

Knowledge:

This course aims to make undergraduate students familiar with the common industrial part of several industrial processes for production or treatment of products using natural methods. Such parts are the fluid transport units mounted with the appropriate pumps or fans or blowers, heat exchange systems for cooling or heating using the appropriate heat exchangers, liquid mixtures stream isolation using condensators, evaporators or distillation columns.

Abilities:

At the end of this course every student should be capable to find the optimal solution for choosing operation industrial units for processing with natural methods using the theoretical knowledge and skills which are achieved during this course.

Skills:

Students should be capable to develop mass and energy balances of a specific process and using the results which obtained through complicated calculations for mass flow through pipes, pumping capacities, heat loadings of heat exchangers and McCabe-Thiele diagrams for distillation columns, to design and sizing this process.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Adapting to new situations
Decision-making
Working independently
Team work
Working in an international environment
Working in an interdisciplinary environment
Production of new research ideas
Project planning and management
Respect for difference and multiculturalism
Respect for the natural environment
Showing social, professional and ethical responsibility and sensitivity to gender issues
Criticism and self-criticism
Production of free, creative and inductive thinking
……
Others…
…….

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Production of free, creative, and inductive thinking
- Team work
- Decision-making
- Adapting to new situations
- Project planning and management
- Criticism and self-criticism

(3) SYLLABUS

S.I. UNITS, Laminar and Turbulent Flow, Reynolds Number, Gas and Liquid Fluid Properties, Liquid and Gas Separation Processes, Pumping and Piping Sizing, Bernoulli Equation, Mass & Energy Balances for Units Operations, Gas-Liquid Equilibrium, Heat Exchangers, Condensators, Evaporators, Extractors, Chillers, Freezers, Extraction Columns, Absorption Columns, Gas-Liquid Absorption Processes, Distillation Process, Distillation Column Calculations, McCabe-Thiele.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	In class, lectures
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Communication with the students also through the course website
TEACHING METHODS *The manner and methods of teaching are described in detail. Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc. The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	

Activity	*Semester workload*
Lectures	45
Tutoring	15
Self-study for preparing for final examination	40

	Course total	100
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	LANGUAGE OF EVALUATION: Greek METHOD OF EVALUATION: Written final exam based on theory and problems demonstration which were provided through course lectures	

(5) ATTACHED BIBLIOGRAPHY

- *Suggested bibliography:*

- Warren I. McCabe, Julian C. Smith, Petter Harriott, Unit Operations of Chemical Engineering, Tziola Ed., In Greek.
- I. Yentekakis, Processes with Natural Methods, Analysis & Design, Kleidarithos Ed., In Greek.
- 3. M. Assael, M. C. Magiliotou, Processes with Natural Methods, Introduction to Calculations, Tziola Ed., In Greek.