ETE714 - Crude Oil (Petroleum), Petrochemicals and Lubricants

COURSE OUTLINE

(1) GENERAL

SCHOOL	SCHOOL OF ENGINEERING		
ACADEMIC UNIT	DEPARTMENT OF MATERIALS SCIENCE ENGINEERING		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	ETE714	**SEMESTER**	7
COURSE TITLE	Crude Oil (Petroleum), Petrochemicals and Lubricants		
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		3	3
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 and specialized general knowledge		
PREREQUISITE COURSES:	NO		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	GREEK		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	-		
COURSE WEBSITE (URL)	http://www.materials.uoi.gr/en/0,02,01.html		

(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*

This course was introduced in the curriculum in the same semester as the compulsory course "Poymer Science" (7th semester) in order to understand basic concepts such as crude oil, petrochemicals and lubricants that are an integral part of the daily life of all of us, especially during our time with the obvious influences from the energy crisis.

The aim is for students to understand and recognize the great usefulness and use of crude oil, petrochemicals and lubricants in several basic necessities on a daily basis and activity.

Extensive reference is made to the origin of the oil, to its refining products, from which derivatives of petrochemicals arise and how important these are with reference to applications of petrochemicals in everyday use e.g. from benzene to form the main ingredient of aspirin, etc.

There is also extensive reference to lubricants and in which categories they are classified according to use. Finally, reference is made to environmental pollution with special concern given to the types of pollutants that arise, how harmful these pollutants are and what their permissible limits should be.

The purpose of all the above is for students to perceive, distinguish and conclude the usefulness

of all the studied subcategories and based on their gained knowledge from other relevant compulsory courses to combine and further expand their knowledge in this direction.
Extensive reference to alternatives is also given, as oil reserves are minimized daily and the effort to find other energy sources that are economically viable is also considered.
Students can now ponder, understand, and perceive problems arising from the irrational and uncontrolled use of liquid fuels today and consider how useful the technologies that are being developed in the direction of alternative energy sources are.
The teaching aids are also updated with a detailed overview of all the new aids that have been published or are to be published related to the course content, while the material is renewed at least every 2 years since the subject of the course is considered very important and goes hand in hand with the daily needs of society.

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

1) Adapting to new situations
2) Decision-making
3) Working independently
4) Team work
5) Production of new research ideas
6) Working in an interdisciplinary environment
7) Production of free, creative and inductive thinking

(3) SYLLABUS

General knowledge on crude oil, petrochemicals and lubricants.
Crude oil chemistry. Basic issues concerning oil and petrochemicals. Oil composition. Oil technology. Oil distillation. Gasoline and major characteristics. Diesel and major characteristics. Fuel oil and major characteristics. Petrochemicals: ethylene. Vapor pyrolysis and parameters that affect it. Raw materials: ethane, propane, butane, naptha. Temperature and retention time. Hydrocarbons partial pressure and vapor pyrolysis unit. Propylene. Unsaturated hydrocarbons with 4 carbon atoms. Aromatic hydrocarbons. Lubricants: Introduction. Mineral oils. Lubricating greases. Synthetic greases. Properties of lubricants. Environmental pollution from fuel: Introduction. Pollutants from burning fuel from means of transportation. Pollutants limits in air. Alternative solutions: Hydrogen, Global warming.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	In class, lectures through powerpoint presentations
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Use of ICT in teaching, communicating with students during teaching and also communicating with the students during office hours
TEACHING METHODS *The manner and methods of teaching are*	***Activity*** | ***Semester workload***

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*	Lectures	39
	Self-study and essay	36
	Course total	75
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: Project assignment of an important part of the class topics to see whether they understand its content. The project is graded from 7 up to 10 depending on quality (at least 20 pages in specific format). The project is also presented with powerpoint. (i) Final written examination: 100% or (ii) Presentation of the assigned essay via powerpoint presentation in class in front of the other students plus written essay of at least 20 pages: 100%	

(5) ATTACHED BIBLIOGRAPHY

-Suggested bibliography:

- Crude Oil (Petroleum), Petrochemicals and Lubricants, Lecture Notes, A. Avgeropoulos, University of Ioannina, Ioannina, 2013
- Oil chemistry & technology, N. A. Nikolaou, Vivliodetiki Publishing, Thessaloniki, 2009 (ISBN: 960-931336-0)
- Fuel-lubricants, C. Bingos, C. Karapanos, Ion Macedonian Publishing, Thessaloniki, 2008 (ISBN: 960-319-163-6)

Publications/articles related to Petroleum-Petrochemical Science & Engineering from international publication journals.