

COURSE OUTLINE

(1) GENERAL

SCHOOL	SCHOOL OF ENGINEERING		
ACADEMIC UNIT	DEPARTMENT OF MINERAL RESOURCES ENGINEERING		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	MRE822	SEMESTER	8
COURSE TITLE	Secondary Energy Sources – Biofuels		
INDEPENDENT TEACHING ACTIVITIES <i>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</i>	WEEKLY TEACHING HOURS	CREDITS	
LECTURES	2		
IN-CLASS EXERCISES	1		
TOTAL	3	5	
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
COURSE TYPE <i>general background, special background, specialised general knowledge, skills development</i>	Special background		
PREREQUISITE COURSES:			
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes		
COURSE WEBSITE (URL)	https://eclass.uowm.gr/courses/MRE165/		

(2) LEARNING OUTCOMES

<p>Learning outcomes</p> <p><i>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.</i></p> <p><i>Consult Appendix A</i></p> <ul style="list-style-type: none"> • <i>Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area</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>Upon successful completion of the course, the student will have all the necessary knowledge about:</p> <ul style="list-style-type: none"> • the ways of producing biofuels and other secondary energy materials • the use of biofuels in Greece and abroad • the scope of biofuels • the legislation governing the production and use of biofuels in the European Union • the social and economic impact of the production and use of biofuels.

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?

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

- 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
- Respect for the natural environment

(3) SYLLABUS

Introduction, the need for the use of alternative and renewable fuels, what are biofuels, where they come from, types of biofuels – biodiesel, bioethanol, biogas, pellets, new generation biofuels. Raw materials, modes of production, advantages, disadvantages, and scope of application of different types of biofuels. Reasons that require their use, social and economic impact of their implementation. Specific issues of production and exploitation of biofuels. The legislative framework in the European Union and Greece for the use of biofuels. Global trends and developments in the field of secondary energy materials.

(4) TEACHING and LEARNING METHODS - EVALUATION

<p style="text-align: center;">DELIVERY</p> <p><i>Face-to-face, Distance learning, etc.</i></p>	Face-to-face	
<p style="text-align: center;">USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</p> <p><i>Use of ICT in teaching, laboratory education, communication with students</i></p>	Use of projection system, organization and programming of the course and communication with students through the asynchronous e-learning platform open eclass.	
<p style="text-align: center;">TEACHING METHODS</p> <p><i>The manner and methods of teaching are described in detail.</i></p> <p><i>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.</i></p> <p><i>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</i></p>	Activity	Semester workload
	Lectures	28
	Theory study	40
	In-class exercises	14
	Exercises study	30
	Bibliographical research	38
Course total	150	
<p style="text-align: center;">STUDENT PERFORMANCE EVALUATION</p> <p><i>Description of the evaluation procedure</i></p> <p><i>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</i></p> <p><i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i></p>	<p>Mid-term written exam (40%), final written exam (60%).</p> <p>The evaluation criteria are given on the relevant page of the course on the asynchronous e-learning platform open e-class and are analyzed to the students at the beginning of the semester.</p>	

(5) SUGGESTED BIBLIOGRAPHY

<p>- Suggested bibliography:</p> <p><i>Dahiya A., 2014, Bioenergy: Biomass to Biofuels, Academic Press, 681 pages</i></p> <p><i>Luque R., Sze Ki Lin C., Wilson K., Clark J., (Eds), 2010, Handbook of Biofuels Production, ScienceDirect, 772 pages</i></p> <p><i>Pandey, A., Larroche, C., Ricke, S.C., 2011, Biofuels: Alternative Feedstocks and Conversion Processes, Elsevier, 642 pages</i></p> <p><i>Τοπάκας Ε., Χριστακόπουλος Π., 2016, Βιοτεχνολογική Παραγωγή Βιοκαυσίμων, Ελληνικά Ακαδημαϊκά Ηλεκτρονικά Συγγράμματα και Βοηθήματα - Αποθετήριο "Κάλλιπος"</i></p> <p><i>Τσατήρης Μ., 2018, Βιοενέργεια και Βιοκαύσιμα, Εκδόσεις Παπαζήσης, 194 pages</i></p> <p>- Related academic journals:</p> <p><i>Biofuels, Taylor & Francis</i></p> <p><i>Biofuels, Bioproducts and Biorefining, Wiley</i></p>
