

## COURSE OUTLINE

### (1) GENERAL

<b>SCHOOL</b>	SCHOOL OF ENGINEERING		
<b>ACADEMIC UNIT</b>	DEPARTMENT OF MINERAL RESOURCES ENGINEERING		
<b>LEVEL OF STUDIES</b>	UNDERGRADUATE		
<b>COURSE CODE</b>	MRE833	<b>SEMESTER</b>	8
<b>COURSE TITLE</b>	Solid Waste Management – Recycling		
<b>INDEPENDENT TEACHING ACTIVITIES</b> <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>		<b>WEEKLY TEACHING HOURS</b>	<b>CREDITS</b>
	LECTURES	2	
	LABORATORY EXERCISES	2	
	<b>COURSE TOTAL</b>	4	5
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
<b>COURSE TYPE</b> <i>general background, special background, specialised general knowledge, skills development</i>	Specialised knowledge		
<b>PREREQUISITE COURSES:</b>			
<b>LANGUAGE OF INSTRUCTION and EXAMINATIONS:</b>	Greek		
<b>IS THE COURSE OFFERED TO ERASMUS STUDENTS</b>	Yes		
<b>COURSE WEBSITE (URL)</b>	<a href="https://eclass.uowm.gr/courses/MRE171/">https://eclass.uowm.gr/courses/MRE171/</a>		

### (2) LEARNING OUTCOMES

<p><b>Learning outcomes</b></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"> <li>• <i>Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area</i></li> <li>• <i>Descriptors for Levels 6, 7 &amp; 8 of the European Qualifications Framework for Lifelong Learning and Appendix B</i></li> <li>• <i>Guidelines for writing Learning Outcomes</i></li> </ul>		
<p>Upon successful completion of the course, the student will have all the necessary knowledge about the methods and technology of solid waste management and material recycling, the systems and ways of collection, treatment and disposal of solid waste and the siting and construction of solid waste disposal sites.</p>		
<p><b>General Competences</b></p> <p><i>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></p> <table style="width: 100%; border: none;"> <tr> <td style="vertical-align: top; width: 50%;"> <i>Search for, analysis and synthesis of data and information, with the use of the necessary technology</i>  <i>Adapting to new situations</i>  <i>Decision-making</i>  <i>Working independently</i>  <i>Team work</i>  <i>Working in an international environment</i>  <i>Working in an interdisciplinary environment</i> </td> <td style="vertical-align: top; width: 50%;"> <i>Project planning and management</i>  <i>Respect for difference and multiculturalism</i>  <i>Respect for the natural environment</i>  <i>Showing social, professional and ethical responsibility and sensitivity to gender issues</i>  <i>Criticism and self-criticism</i>  <i>Production of free, creative and inductive thinking</i>  <i>.....</i> </td> </tr> </table>	<i>Search for, analysis and synthesis of data and information, with the use of the necessary technology</i> <i>Adapting to new situations</i> <i>Decision-making</i> <i>Working independently</i> <i>Team work</i> <i>Working in an international environment</i> <i>Working in an interdisciplinary environment</i>	<i>Project planning and management</i> <i>Respect for difference and multiculturalism</i> <i>Respect for the natural environment</i> <i>Showing social, professional and ethical responsibility and sensitivity to gender issues</i> <i>Criticism and self-criticism</i> <i>Production of free, creative and inductive thinking</i> <i>.....</i>
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<i>Production of new research ideas</i>	<i>Others...</i> .....
<ul style="list-style-type: none"> <li>• Search for, analysis and synthesis of data and information, with the use of the necessary technology</li> <li>• Adapting to new situations</li> <li>• Decision-making</li> <li>• Working independently</li> <li>• Team work</li> <li>• Project planning and management</li> <li>• Respect for the natural environment</li> </ul>	

### (3) SYLLABUS

Introduction (social, environmental and political dimensions), Sources of solid waste production, Composition, characterization and sampling of waste, Institutional framework for solid waste, Collection, transport, storage, transshipment, Sorting at source (methods, machinery, etc.), Recovery and reuse of materials, Principles of solid waste management planning -Integrated management systems, Solid waste treatment, Solid waste disposal sites, Risk assessment from sites disposal, Solid waste from mining activities, Solid waste from metallurgical and enrichment processes. Quantitative and qualitative characteristics of solid waste. Rates of solid waste production. Prevention and minimization of waste production. Caching. Siting of bins. Solid waste collection systems. Garbage trucks. Transshipment stations. Sorting at source. Recycling. Material recovery. Sorting centers for recyclable materials. Heat treatment of municipal solid waste. Biological treatment of municipal solid waste. Energy recovery. Location criteria and infrastructure works for solid waste disposal sites. Operation of the Landfill

### (4) TEACHING and LEARNING METHODS - EVALUATION

<b>DELIVERY</b> <i>Face-to-face, Distance learning, etc.</i>	Face-to-face	
<b>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</b> <i>Use of ICT in teaching, laboratory education, communication with students</i>	Use of projection system, organization and programming of the course and communication with students through the asynchronous e-learning platform open eclass.	
<b>TEACHING METHODS</b> <i>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</i>	<i>Activity</i>	<i>Semester workload</i>
	Lectures	28
	Theory study	32
	Laboratory exercises	28
	Exercises preparation work	37
	Course total	125

<p><b>STUDENT PERFORMANCE EVALUATION</b></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>Intermediate written examination (20%), final written examination (60%), laboratory exercises (20%).</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>
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## (5) SUGGESTED BIBLIOGRAPHY

- *Suggested bibliography:*

*Σαθβίδης Σ., 2007, Εμπλουτισμός Στερεών Αποβλήτων – Τεχνολογίες Ανακύκλωσης, Εκδόσεις Αλέξανδρος, 436 pages*  
*Κούγκολος Α., Εμμανουήλ Χ., 2020, Διαχείριση Στερεών Αποβλήτων, Εκδόσεις Τζιόλα, 576 pages*

- *Related academic journals:*

*Journal of Solid Waste*  
*Journal of Solid Waste Technology and Management*  
*Waste Management*  
*Waste Management and Research*