

## COURSE OUTLINE “SOLID WASTE MANAGEMENT & SOIL PROTECTION”

### (1) GENERAL

SCHOOL	ENGINEERING SCHOOL		
DEPARTMENT	CIVIL ENGINEERING DEPARTMENT		
LEVEL OF STUDIES	POSTGRADUATE		
COURSE CODE	661004	SEMESTER	1 <sup>st</sup>
COURSE TITLE	“SOLID WASTE MANAGEMENT & SOIL PROTECTION”		
<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>ECTS Credits</b>
Lectures		3	6
<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>	Scientific Area		
<b>PREREQUISITE COURSES:</b>	NO		
<b>LANGUAGE OF INSTRUCTION and EXAMINATIONS:</b>	Greek		
<b>IS THE COURSE OFFERED TO ERASMUS STUDENTS</b>	NO		
<b>COURSE WEBSITE (URL)</b>	<a href="http://www.environmentalprotection.gr/?page_id=152">http://www.environmentalprotection.gr/?page_id=152</a>		

### (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

The specific learning outcome deriving from the course “Solid Waste Management and Soil Protection”, has been designed and is expected to be as follows:

- a) Making the students familiar with the basic ideas and terminology, relevant to solid waste and the well established processes for treatment.
- b) Focusing on the problems deriving from waste management within the current social status, which includes the description of the existing legal framework in terms of EU and national legislation, as well as of the related regulatory rules issued by the State or the local authorities.

- c) Comparative evaluation of methods and processes for waste management, aiming at complying with the existing legislation, but also, aiming at the prospect of the way towards a “zero waste” society.
- d) Knowledge of the legal obligations of installations against the public administration that either waste management is either their main activity or the produce waste because of their main activity, as well as the legal tools to comply with those obligations.
- e) Identification of the basic cost elements associated with waste management (either as the main activity or as part of the overall production activity).
- f) Establishment and capabilities of sharing of a sensitized approach regarding pollution prevention, reduction of waste, recycling and reuse of materials and energy, etc.

Upon the successful completion of the course, it is expected that the students will be able to:

- In the area of knowledge, they learn what is considered as a waste, their categories and the specific impact of each of waste category on economic and social life, and, primarily, on human health and safety as well as on fauna and flora, which are the main terms/definitions and principles of waste management, which are the waste management operation and how they are classified, which are the main direction of the waste management legislation and the possible changes in the near future, which are the available technologies, their environmental impacts and their operation and investment cost.
- Regarding the skills, the students are trained into recording and understanding a complex environment (mainly legal, but also techno-economic) for waste management, they become familiar with treatment techniques and get the feeling of basic principles for optimized management, based on the international and domestic experience.
- In the level of capabilities, it is believed that the students’ capabilities to identify the critical waste management problems, on a professional level, in the framework of a greater project is strongly enhanced, as well as their **ability to make decisions and suggest solutions, to evaluate alternatives, to understand and manage waste issues** in small or large scale, as per national and EU legislation.

#### 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>

The capabilities and broader characteristics, that are expected to be obtained by the students, are:

- Respect for the natural environment
- Showing social and professional responsibility
- Adapting to new situations

- Decision-making
- Team work
- Project planning and management
- Working in an interdisciplinary environment
- Production of free, creative and inductive thinking

### (3) COURSE CONTENT

The Syllabus of the course “Solid Waste Management and Soil Protection” is as follows:

- EU legal framework on waste, waste management in the EU and direction of the EU acquis (circular economy), basic terms.
- National legal framework.
- Waste prevention.
- Waste recovery (material and energy).
- Waste disposal (landfilling and incineration/coincineration).
- Waste collection and shipment.
- Management of household waste in Greece.
- Management of non-hazardous industrial waste and waste of production activities.
- Waste management plans (national and regional) and prevention plans.
- Treatment technologies of hazardous waste.
- Management of Hazardous Waste in Greece.
- Management of Medicinal Waste in Greece.
- Management of mining waste.
- Soil protection and rehabilitation of illegal landfills.

### (4) TEACHING & LEARNING METHODS – EVALUATION

<b>DELIVERY</b> <i>Face-to-face, Distance learning, etc.</i>	Face-to-face, Distance learning
<b>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</b> <i>Use of ICT in teaching, laboratory education, communication with students</i>	<ul style="list-style-type: none"> <li>▪ Access to data bases and special coding software for search and management of information using ICT.</li> <li>▪ Communication and electronic submission.</li> <li>▪ Support of teaching through the website.</li> <li>▪ Presentation in PP, video and linking with specialized websites through the Internet.</li> </ul>

TEACHING METHODS	Activity	Semester workload
<p>The manner and methods of teaching are described in detail.</p> <p>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.</p> <p>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</p>	Lectures	39
	Preparation for homework on case studies (individual or group work)	30
	Study and analysis of bibliography	75
	Educational visits	6
	<b>Course total</b>	<b>150</b>
<p><b>STUDENT PERFORMANCE EVALUATION</b></p> <p>Description of the evaluation procedure</p> <p>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</p> <p>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</p>	<p>Written exams with multiple choice system (50%)</p> <p>Short answers question (20%)</p> <p>Written work (30%)</p>	

## (5) ATTACHED BIBLIOGRAPHY

### ENGLISH

#### 1. Sources relevant to environmental science and wastes

- G. Tyler Miller, "Environmental Science", Wadsworth Publ. Co., 1997.
- The Fu Yen, "Environmental Chemistry", Pearson Prentice Hall, USA, 1999.
- European Environmental Agency, "The European Environment – State and Outlook", 2005.
- R. T. Wright, "Environmental Science", Pearson Prentice Hall, 9<sup>th</sup> Edition, USA, 2005.
- T.G. Spiro, W.M. Stigliani, "Chemistry of the Environment", 2<sup>nd</sup> Edition, Pearson Prentice Hall, USA, 2002.
- P.A. Vesilind, J.J. Peirce, R.F. Weiner, "Environmental Pollution and Control", 3<sup>rd</sup> Edition, Butterworth – Heinemann, USA, 1990.
- Naoko Tojo, Alexander Neubauer and Ingo Brauer, IIIIEE, Waste management policies and policy instruments in Europe, Report written as part of project HOLIWAST, WP 1, 2006.

## **2. Legal or quasi legal texts (guidelines etc.), such as:**

- National Waste Management Plan.
- National Prevention Plan.
- European Waste Catalogue.
- Guidance document on “Πράσινα Σημεία”.
- Preparing a Waste Management Plan. A methodological guidance note, European Commission, Directorate-General Environment, 2012.
- Guidance on the interpretation of key provisions of Directive 2008/98/EC on waste, European Commission, Directorate-General Environment, 2012.
- ETC/SCP working paper 1/2012, Overview of the use of landfill taxes in Europe, April 2012.
- END-OF-WASTE CRITERIA FOR WASTE PLASTIC FOR CONVERSION, TECHNICAL PROPOSALS, Final draft report, March 2013, IPTS (Institute for Prospective Technological Studies) and JRC, Sevilla, Spain.
- European Commission, Indicative Roadmap of Waste Policy and Legislation, February 2013.
- Performances – Final Report, Bio Intelligence Service, Contract ENV.G.4/FRA/2008/0112, 10 April 2012.
- OECD/EEA database on instruments used for environmental policy and natural resources management, <http://www2.oecd.org/ecoinst/queries/>
- EEA, Resource efficiency in Europe, Policies and approaches in 31 EEA member and cooperating countries, No 5/2011.
- EEA, 2011 Survey of resource efficiency policies in EEA member and cooperating countries, Country Profile Greece, May 2011.

### **GREEK**

#### **3. Ανδ. Ανδρεόπουλος.** Εκπαιδευτικές σημειώσεις στα ακόλουθα:

- α) Διαχείριση Αστικών Αποβλήτων.
  - β) Διαχείριση Αποβλήτων Παραγωγής.
  - γ) Επικίνδυνα Απόβλητα.
  - δ) Απόβλητα Υγειονομικών Μονάδων.
  - ε) Εξορυκτικά Απόβλητα.
- Λοϊζίδου Μ., (2008), «Εισαγωγή στην Περιβαλλοντική Επιστήμη – Περιβαλλοντική Πολιτική», διδακτ. σημειώσεις, ΕΜΠ (Σχολή Χημικών Μηχανικών).