

ETY907 – Packaging Materials / Recycling

COURSE OUTLINE

(1) GENERAL

SCHOOL	SCHOOL OF ENGINEERING		
ACADEMIC UNIT	DEPARTMENT OF MATERIALS SCIENCE AND ENGINEERING		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	ETY907	SEMESTER	9
COURSE TITLE	Packaging Materials / Recycling		
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 / Case Studies	3	3	
<i>Add rows if necessary. The organization of teaching and the teaching methods used are described in detail at (d).</i>			
COURSE TYPE <i>general background, special background, specialized general knowledge, skills development</i>	Specialized general knowledge		
PREREQUISITE COURSES:	NO		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	LECTURES IN GREEK, PRESENTATION IN ENGLISH/GREEK		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	NO		
COURSE WEBSITE (URL)	http://users.uoi.gr/nbarkoul/; http://ecourse.uoi.gr/course/view.php?id=2037		

(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 course provides introductory lectures and gives the opportunity to the students to follow a problem based learning methodology which is based on case studies. This is an attempt to familiarize the students both with the scientific content of the course and their future role as materials engineers.

The principal aims of implementing problem-based learning are:

- To integrate and reactivate knowledge and skills from a range of multidisciplinary modules
- To acquire knowledge through active-learning
- To teach students how to work in groups and manage group projects
- To improve and develop the communication skills of the students
- To develop problem solving skills

- To encourage self-motivation and thinking

By completing the course, the students are expected to have acquired the following:

Knowledge:

- Have a deep **understanding** of packaging materials, their characteristics and properties, criteria on how to select appropriate materials, life cycle analysis of packaging materials, selection processes, recycling processes and packaging and recycling interaction

Abilities:

- To collect, organize and evaluate interdisciplinary information obtained from various sources
- To organize scientific information and present it effectively
- To solve problems in an organized way using brainstorming meetings
- To work in groups, manage meetings, write agenda and minutes

Skills:

- Around organizing interdisciplinary meetings
- Around teamwork, capturing key information, selecting appropriate actions for optimal scientific and technological results

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
- 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

The course is a specialization course on packaging, sustainability and recycling. The course aims at introducing students to the key concepts of product life cycle, choice of materials based on their lifecycle, the waste management hierarchy as well as the all the available recycling methodologies. The content of the course is as follows:

- The Role of Packaging
- Packaging Materials, Packaging Distinctions, Packaging Types, Packaging Design Objectives, Packaging symbols
- Packaging design problems
- Methods of manufacturing
- Evaluation criteria for an Ecological Packaging
 - Consumption of Raw Materials / Conservation of Natural Resources / Energy consumption / Disposal of Waste / Pollutions during production
- Environmental Legislation for Packaging (Reuse / Recycling)
- Plastic Waste
- Plastic Packaging & Environment
- Recycling of Plastic Waste
- Plastic Recycling Technology

- Primary Recycling, Recyclingplasp process, Recycling of Thermosetting Plastic Products, Recycling of Plastics / Plastic Non-Household & Acrylic Engineering
- Food & Recycled Plastic Packaging

For the students following the case studies, the course is divided in three projects with subjects related to recycling and packaging materials where the students are asked to deliver a specific project working in a team of 3-5 members. The students meet every week in the class (obligatory) and outside to deliver their project. During this meeting they take, on a circular basis, the role of chair, secretary, scribe and group member. They are asked to organize their meetings sending out an agenda and the minutes of the meeting. Every project has a different deliverable in the form of poster, presentation, video, website, stand etc.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY <i>Face-to-face, Distance learning, etc.</i>	Face-to-face in the class											
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY <i>Use of ICT in teaching, laboratory education, communication with students</i>	Use of PC for data and information, preparation of deliverables, communication of the team using email/social media/ecourse platform											
TEACHING METHODS <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>	<table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th style="width: 60%;"><i>Activity</i></th> <th style="width: 40%;"><i>Semester workload</i></th> </tr> </thead> <tbody> <tr> <td>Lectures</td> <td>39</td> </tr> <tr> <td>Laboratory practice</td> <td>16</td> </tr> <tr> <td>Project</td> <td>20</td> </tr> <tr> <td>Course total</td> <td>75</td> </tr> </tbody> </table>		<i>Activity</i>	<i>Semester workload</i>	Lectures	39	Laboratory practice	16	Project	20	Course total	75
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STUDENT PERFORMANCE EVALUATION <i>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.</i>	<p>LANGUAGE OF EVALUATION: Greek</p> <p>METHOD OF EVALUATION: Written exam (multiple choice) at the end of the semester for students who do not choose to follow the case studies. For students who work as a team, the evaluation is as follows:</p> <ul style="list-style-type: none"> - Individual evaluation during the semester based on the deliverables of each participant (45%) - Self-assessment and assessment by the team members, with low impact to the final score (5%) - Rating of each group for each case study completed (3 in total per group) (50%) 											

(5) ATTACHED BIBLIOGRAPHY

Suggested bibliography:

- Recycling of Plastics, K. Bountinas, M. Lezkidou
- Packaging and Recycling, N. Karakasidis