ETE 906 - Polymers and Related Materials with Controlled Morphology

COURSE OUTLINE

(1) GENERAL

SCHOOL	SCHOOL OF ENGINEERING			
ACADEMIC UNIT	DEPARTMENT OF MATERIALS SCIENCE ENGINEERING			
LEVEL OF STUDIES	UNDERGRADUATE			
COURSE CODE	906	**SEMESTER**	9	
COURSE TITLE	Polymers and Related Materials with Controlled Morphology			
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 is the further contact with the applied use of Polymers in various research fields such as biopolymers, applications of copolymers at the industrial level as well as the effect of mechanical properties on these applications, how to adhere polymers to surfaces and how it can be determined - calculated by various techniques, study of the production of complex porous materials with polymeric matrices and finally deepening in the concept of supermolecular systems where knowledge of advanced Organic Chemistry is necessary.

Students are now fully specialized in the field of Polymers with the main purpose and goal of several of them to prepare their dissertation in the direction of Polymers, now having the ability to better understand more specialized concepts / applications of polymers in several areas of technological excellence.

The teaching aids are also updated with a detailed overview of all new aids that have been published or are going to be published in the course content while the teaching material is renewed at least every 2 years since a significant research activity takes place worldwide in various fields.

There is no overlap of the teaching material with other courses. It is the only course that deals with the applications of Polymer Science & Engineering in various research fields.
Basic knowledge is considered necessary and several times the compulsory courses in the field of Polymers (Polymer Science - Polymer Engineering - Materials Laboratory V) must have been passed, otherwise the students face significant problems in understanding and fully responding to the work they receive.

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) Working independently
2) Working in an interdisciplinary environment

(3) SYLLABUS

Course outline and topics

- ✓ Biopolymers (proteins, noucleic acids, polypeptides).
- ✓ Block copolymer applications.
- ✓ Adsorption of block copolymers at solid – liquid interfaces.
- ✓ Preparation of nanocomposites, porous materials and other structures.
- ✓ Supramolecular systems.
- ✓ Block copolymer with phase segregated nanoparticles.
- ✓ Nanostructured polymer blends.

The overall aims and objectives are to understand basic concepts, meanings concerning advanced polymers and polymer related materials, especially blends with polymer matrix science and engineering.

(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 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*	

Activity	*Semester workload*
Lectures	39
Essay and self-study	36

the ECTS		
	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 6 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:

- Block Copolymers in Nanoscience, M. Lazzari – G. Liu – S. Lecommandoux, Wiley VCH, New York, 2006
- Lecture Notes, A. Avgeropoulos, N. Zafeiropoulos, M. Karampela, University of Ioannina, Ioannina, 2018
- Developments in Block Copolymer Science and Technology, I. W. Hamley, Wiley Blackwell, London, 2004

Scientific articles from international scientific journals of various publishers (ACS, RSC publicizing, Wiley, Springer, etc.)