ETY002 – Diploma Thesis II

COURSE OUTLINE

(1) GENERAL

SCHOOL	SCHOOL OF ENGINEERING		
ACADEMIC UNIT	DEPARTMENT OF MATERIALS SCIENCE AND ENGINEERING		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	ETY002	**SEMESTER**	10th
COURSE TITLE	Diploma Thesis II		

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**
Research activities	12	24
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*	Specialized general knowledge, Skills development
PREREQUISITE COURSES:	The student should owe less than 14 subjects for completion of studies
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	GREEK
COURSE WEBSITE (URL)	

(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*

Diploma Thesis II is the continuation of Diploma Thesis I. In Diploma Thesis II, the student applies in practice, using the methodologies and approaches in which she/he has already been trained, the research project he/she has developed. During this experimental and / or theoretical research work the student is guided by the supervisor Professor and by doctoral and postdoctoral researchers working in the corresponding laboratory in order to achieve the goals already set in Diploma Thesis I. During this time the student participates in the activities of the laboratory such as seminars, symposia or conferences and in the production of publications and papers related to the subject of his/her dissertation.

Having completed Diploma Thesis I upon completion of Diploma Thesis II, the student is expected to have acquired the following:

The student now has

- highly specialized **knowledge** of the subject of the Diploma Thesis at the cutting edge of

current scientific development

- **knowledge and skills** of handling equipment and / or computer programs of high scientific and / or technological interest in cutting-edge fields
- ability to obtain specific data by conducting laboratory experiments or theoretical calculations
- **skills** to analyze scientific / technological results and redesign a research plan
- **ability** to solve scientific and / or technological problems through theoretical / experimental approaches, and / or scientific calculations
- **abilities and skills** to capture the methodological approach, to explain the scientific content, results, and conclusions in a technical text (in the form of a dissertation)
- **abilities and skills** to support an oral presentation of all the research work
- **ability** to make proposals to extend the research after its completion either to other fields or at a deeper level

All the previously mentioned points mature the student and make him/her a Materials Engineer capable of scientific decision-making and preparing a study, efficient in managing complex problems by developing new approach strategies, and finally taking responsibility in his/her field of specialization.

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…*
	…….

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Decision-making
- Autonomous work
- Production of new research ideas
- Criticism and self-criticism
- Production of free, creative and inductive thinking

(3) SYLLABUS

Research work in one of the below mentioned scientific and technological fields:

Ceramic materials: familiarization of students with manufacturing/preparation methods and study of properties of traditional, advanced and new ceramics. Learning how to process ceramic raw materials. Special emphasis is given to learning new methods and techniques (manufacturing, molding, drying and baking) aiming the introduction of competitive technologies in Greece.
Metallic materials: familiarization of students with applied metallurgical technologies, in understanding the interdependence of the triptych Structure - Properties - Production method but also in understanding the role of the environment in industrial process and technological development
Polymeric materials: familiarization of students with the chemistry (synthesis, modification) of polymers, the physicochemistry of polymer solutions and melts, their structure and behavior in the viscoelastic and solid state, the characterization and technology of polymers.
Electronic materials: main focus on the detailed description of electrical, optical and magnetic properties of semiconductor, superconducting and magnetic materials and on design, composition, construction and characterization of modern electronic devices and micro- and nano-electromechanical systems and sensors by cutting-edge technology methods, such as microelectronics, optoelectronics, photonics and nanotechnology.

Composite Materials: familiarization of students with the experimental study of composite materials as well as study of their micromechanical behavior. Research in the field of composite and intelligent materials and structures, from their microscopic to macroscopic response to thermomechanical and / or environmental stresses. Development of control and activation systems as well as technologies for their integration into advanced composites / structures aimed at system optimization: Construction - Response - Structural Integrity.
In Materials Engineering: familiarizing students with the development of innovative methodologies, study of mechanical behavior and advanced non - destructive methods for quantification of wear, monitoring of healthy operation, and evaluation of residual life of materials and structures, that undergo reduction of their structural integrity, due to mechanical and / or environmental (temperature, corrosion) aging and finally technological design of materials in a wide range of industrial applications
In Mathematical Modeling of Materials and Scientific Calculations: familiarization of students with developing Mathematical and Computational techniques for modeling, study and solution of materials science and technology problems. Creating analytical methods and computer techniques for the study of simulations of engineering problems, mathematical physics and wave scattering applications in non-destructive control and in Biomedical technology.

(4) TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY Face-to-face, Distance learning, etc.</td><td>Face-to-face</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
Use of ICT in teaching, laboratory education, communication with students</td><td>Communication, file and information exchange using Synchronous and asynchronous educational platforms such as Msteams/ecourse/drive</td></tr>
<tr><td>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 the ECTS</td><td>
<table>
<tr><th>Activity</th><th>Semester workload</th></tr>
<tr><td>Laboratory experiments / Theoretical Calculations</td><td>300</td></tr>
<tr><td>Unguided study</td><td>150</td></tr>
<tr><td>Dissertation writing</td><td>100</td></tr>
<tr><td>Preparation of the presentation – final examination</td><td>50</td></tr>
<tr><td></td><td></td></tr>
<tr><td>Course total</td><td>600</td></tr>
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<tr><td>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.</td><td>LANGUAGE OF EVALUATION: Greek

METHOD OF EVALUATION: Public presentation followed by an oral examination conducted by a three membered committee
•Scientific Content
(weighting factor 40%)
• Structure, Syntax, Written Text
(weight 30%)
• Presentation and Final Examination
(weighting factor 30%)</td></tr>
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(5) ATTACHED BIBLIOGRAPHY

Suggested bibliography:

- Books, papers and reviews in international scientific journals relevant to the selected

- by the candidate student research field