ETY918 – Diploma Thesis I

COURSE OUTLINE

(1) GENERAL

SCHOOL	SCHOOL OF ENGINEERING		
ACADEMIC UNIT	DEPARTMENT OF MATERIALS SCIENCE AND ENGINEERING		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	ETY918	**SEMESTER**	9
COURSE TITLE	Diploma Thesis I		

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	12
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
IS THE COURSE OFFERED TO ERASMUS STUDENTS	
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*

The principal learning objectives of Diploma Thesis for the student are:

- to systematize, integrate and apply the knowledge acquired in previous semesters
- to delve into a specific subject by solving an innovative problem relevant to the program of studies and the research activities of the Department
- to develop problem solving skills by developing initiative towards tackling the issue under investigation by exploiting the guidance of the supervising Professor
- to encourage self-motivation and thinking

The Diploma Thesis I focuses on understanding the subject of a specific research proposal, on the literature review of the topic, on the design of the solving methodology (whether theoretical or experimental) and finally on training the student to use the appropriate tools to conduct experiments and / or theoretical calculations etc.

By completing the Diploma Thesis I, the student is expected to have acquired the following:

Knowledge:

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

Abilities:

- approach the dissertation problem which includes research and innovation elements using the knowledge acquired throughout the duration of the studies
- to solve the scientific problem through theoretical / experimental approaches, and / or scientific calculations
- to record the theoretical background and the research plan in a technical text (in the form of a dissertation thesis)
- to orally present the theoretical background and the research plan

Skills:

- to combine knowledge and to distinguish and appreciate how to apply bibliographic data and previous scientific knowledge
- select the appropriate techniques / approaches and adapt them to the problem to be solved using original ideas
- to develop new strategic approaches towards resolving the issue under investigation in the current thesis
- to take full responsibility for the proposal for the implementation of his / her dissertation at field

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

In Diploma Thesis I, initially the student guided by the supervisor identifies the objectives, lays out a work plan to follow and searches the international bibliography in order to document the originality of the proposed research work. The data collected are presented to the supervisor as a proposed experimental or theoretical research project which can be implemented after his/her consent. After this approval follows the training of the student in methods and techniques, necessary to implement the research project for example the preparation of the experiments to be carried out.

Below are mentioned indicative scientific and technological fields for the diploma thesis:

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

DELIVERY *Face-to-face, Distance learning, etc.*	Face-to-face
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Communication, file and information exchange using Synchronous and asynchronous educational platforms such as Msteams/ecourse/drive
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*	

Activity	*Semester workload*
Study and analysis of bibliography	60
Unguided study	40
Work (experimental or theoretical or simulations or any combination)	100
Report / dissertation writing	20
Laboratory practice, training	80
Course total	300

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: Oral examination Research project presentation

(5) ATTACHED BIBLIOGRAPHY

Suggested bibliography:

- Books, papers and reviews in international scientific journals relevant to the selected
- by the candidate student research field