COURSE OUTLINE

(1) GENERAL

SCHOOL	ENGINEERING SCHOOL		
ACADEMIC UNIT	DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	EEE.5.5	SEMESTER	5
COURSE TITLE	ELECTROMECHANICAL ENERGY CONVERSION		

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	4	
Laboratory		
Total	4	
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization Course
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek(official)
IS THE COURSE OFFERED TO ERASMUS STUDENTS	YES (in English for Erasmus Students)
COURSE WEBSITE (URL)	https://eclass.uniwa.gr/courses/EEE358/

(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*

Upon completion of the course, students will be able to:

- Understand the basic concepts of magnetic circuits as applied to electric machines.
- Understand the basic operation of a transformer.
- Describe the critical parts of transformer specifications
- Explain transformer protection fundamentals
- Explain construction and operation principle of transformers
- Understand basic motors and generators.
- Describe the operation of DC and AC machines
- Explain construction and operation principle of DC motors and DC generators
- Explain construction and operation principle of AC motors and AC generators

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
Adapting to new situations
Decision-making
Working independently
Team work
Working in an international environment
Working in an interdisciplinary environment
Production of new research ideas
Project planning and management
Respect for difference and multiculturalism
Respect for the natural environment
Showing social, professional and ethical responsibility and sensitivity to gender issues
Criticism and self-criticism
Production of free, creative and inductive thinking
……
Others…
…….

The course aims at fostering the following capabilities:

Search for, analysis and synthesis of data and information, with the use of the necessary technology

- Decision making
- Independent work
- Teamwork
- Work in an international environment

(3) SYLLABUS

- PRINCIPLES OF ELECTROMECHANICAL ENERGY CONVERSION
- FORCE AND TORGUE CALCULATION
- MAGNETIC CIRCUITS
- CONVERSION ENERGY
- FERROMAGNETIC MATERIALS
- FUNDAMENTAL PRINCIPLES FOR ANALYSIS OF TRANSFORMERS AND ELECTRICAL MACHINES
- TRANSFORMERS
- SINGLE - PHASE TRANSFORMERS

- THREE - PHASE TRANSFORMERS
- CONFIGURATION OF SINGLE PHASE AND THREE PHASE POWER TRANSFORMERS
- DC ELECTRIC MACHINES
- TYPES OF DC MACHINES EXCITED
- CATEGORIES OF AC ROTATING MACHINES
- SYNCHRONOUS GENERATOR
- SYNCHRONOUS MOTOR
- CALCULATION OF EQUIVALENT CIRCUIT CONSTANTS

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Lectures and exercises, face-to-face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Teaching using ICT, Laboratory Education using ICT, Communication and Electronic Submission
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*	
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 and English for students Erasmus. Final Written Exams: 100%

Activity	*Semester workload*
Lectures	52
Personal study	24
Lectures Study Material	52
Exercises	13
Tutorial / Interactive teaching	7
Course total	***150***

(5) ATTACHED BIBLIOGRAPHY

1. Malatestas P., (2012). Electric Machines , Tziolas Publications, Thessaloniki (in Greek)
2. Safakas A., (2007). Electric Machines - Volume A, Publications of University of Patras (in Greek)
3. Chapman S. , (2009). Electric Machines , Tziolas Publication Thessaloniki (in Greek),
4. Fitzgerald A. E. , Kingsley C., Umans S., (2003). Electric machinery, McGraw-Hill,
5. Cathey J. J., (2001). , Electric machines, McGraw-Hill,
6. Hindmarsh J., (1995), Electrical machines and their applications, Elsevier