COURSE OUTLINE

1. GENERAL

SCHOOL:	Engineering		
ACADEMIC UNIT:	Industrial Design and Production Engineering		
LEVEL OF STUDIES:	Undergraduate		
COURSE CODE:	**1006**	**SEMESTER**	**1**
COURSE TITLE:	Electrical Circuits		

INDEPENDENT TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**	**ECTS CREDITS**
Theory (Lectures)	3	3
Tutorial/Project	0.5	1
Laboratory	0.5	1
	4	**5**

COURSE TYPE:	General knowledge
PREREQUISITES COURSES:	No
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	https://eclass.uniwa.gr/courses/IDPE188/

2. LEARNING OUTCOMES

Learning Outcomes

Upon completion of the course, students will have:

1) Knowledge and critical understanding of the basic theory of electrical circuits, fundamental for future relevant courses
2) Knowledge and skills in solving circuits with resistors, power calculation, as well as power balance
3) Knowledge and skills required for circuit wiring tasks, usage of power supplies and usage of multimeters (measurement of currents and voltages).

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

1) Solve direct current circuits by applying the laws of Kirchhoff, perform loop method analysis, solve using mesh current and source transformation methods
2) Predict the behavior of electrical quantities in some circuits and be able to select the values of the components they need be used to achieve desired circuit behavior
3) Find the equivalent Thevenin-Norton circuit and calculate the maximum power transfer to the load
4) Operate power supplies, multimeters and perform measurements

General Competences

- Ability to search, analyze and synthesize data and information, using the necessary internet technologies and bibliographic research and networking.

- Ability to make decisions, relevant to problems occurring during theory of lab exercises
- Ability to work independently, through the preparation of individually performed tasks and exercises.
- Ability for team work, through the elaboration of team works and exercises.

3. SYLLABUS

1. Background knowledge of Electricity including: electric charge, Coulomb's law, electric field, field strength, voltage potential.
2. Electrical current, electrical circuits, voltage. Kirchhoff's laws
3. Resistors, Ohm's law, independent and dependent voltage and current sources. Active circuit components
4. Real voltage and current sources and equivalence transformations
5. Resistors, capacitors and coils wiring, open/short circuits, voltage/current divider circuits, voltage supply wiring
6. Systematic methods for circuit solving: loop method and mesh meth in passive and active circuits.
7. Linear circuit theorems: superposition principle, transformation of resistors in star-delta wiring.
8. Thevenin and Norton theorems, maximum power transfer theorem.
9. Magnetic field. Electricity generation and transmission
10. Introduction to alternating current (AC)

Lab Exercises
The laboratory part of the course includes the execution of exercises, designed in order for students to familiarize with the basic principles of linear circuits, and measurement techniques.

4. TEACHING and LEARNING METHODS – EVALUATION

DELIVERY	Face-to-face
USE OF INFORMATION AND COMMUNICATION TECHNOLOGY	Use of ICT in teaching, laboratory education, communication with students.
TEACHING METHODS	

Method description / Activity	***Semester Workload***
Lectures	39
Practice Exercise Lectures	13
Laboratory work	13
Non-guided personal study	85
Course Total (30h/ECTS)	**150**

STUDENT PERFORMANCE EVALUATION	**Language of Assessment** Greek

	Description Written exams, laboratory evaluation and project evaluation **Student assessment methods** • Final written examination (70%) • Lab exercises (30%) • (Optional) written essays (projects) or mid-term examination (20% deducted from final written examination) The assessment criteria are announced to students at the beginning of the semester and are published on the course webpage in the e-Class platform.

5. ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

1. Χαριτάντη Γ: Ηλεκτρικά κυκλώματα, Εκδόσεις Εκδόσεις Αράκυνθος, 2014
2. Sadiku-Alexander, Εισαγωγή στα Ηλεκτρικά Κυκλώματα, Εκδόσεις Τζιόλα, 2013, ISBN 9604182625
3. Χατζαράκης Γεώργιος : Ηλεκτρικά κυκλώματα, Εκδόσεις Τζιόλα 2015