a) General			
School	ENGINEERING		
Academic unit	MECHANICAL ENGINEERING		
Level of studies	Undergraduate		
Course code	MM002Y02	*Semester*	II
Course title	**Electric circuits - Electronics technology**		
Independent teaching activities		*Weekly teaching hours*	*ECTS*
Lectures		4	5.5
Laboratory exercises		1	
Course type	General background		
Course category	Compulsory		
Prerequisite courses	-		
Language of instruction and examinations	Greek		
Is the course offered to Erasmus students	No		
Course website (url)	https://eclass.uniwa.gr/courses/MECH133/		

b) Learning outcomes and general competences

b1. Learning outcomes

Upon successful completion of the course, student will be able to

- identify and describe the key elements of an electrical circuit to combine the construction of simple electrical circuits.
- distinguish the different configurations of sources and resistors and explain their functionality.
- apply Kirchhoff's laws in simple and more complex circuits and to solve the basic equations that describe their function
- apply methods for resolving linear and nonlinear circuits (superposition method, equivalent source voltage and current, independent methods of loop currents and potentials of the nodes, graphic methods)
- create the equivalent Thevenin and Norton circuits and calculates the maximum power transfer to them.
- evaluate the circuits to solve and compare the different methodologies which can be resolved.
- recognize the physical structure, distinguishes operating areas and designs and to evaluates the characteristic voltage-current curves of the bipolar transistor connection (BJT), draw the load line and explain and define its operating point BJT, to calculate the continuous current analysis of the BJT and to evaluate its switching function.
- clarify the differences between FET, MOSFET, Thyristor

b2. General competences

- Search for, analysis and synthesis of data and information with the use of the necessary technology
- Adapting to new situations
- Working independently
- Teamwork
- Production of new research ideas
- Production of free, creative and inductive thinking

c) Syllabus

Electric current, electric circuit, voltage, Kirchhoff laws, Resistors, Ohm law, Voltage and current sources, Wiring resistance, open circuit and short circuit, voltage and current divider, sources assembly, Methods for resolving linear and nonlinear circuits (superposition method, equivalent source voltage and current, independent methods of loop currents and potentials of the nodes, graphic methods), Equivalent Thevenin and Norton circuits and calculation of the maximum power transfer to them, p-n junction diode (Diode with forward and reverse bias. Characteristic curve of P-N junction, Load line), Diode circuits, Diode applications, Bipolar transistor (BJT): Physical structure, Operation, Characteristic I-V curves, Load line, transistor as switch, amplifier and oscillator, bias circuits, MOSFETs, Thyristors

Laboratory training of students carrying 13 laboratory exercises focused on key items of theoretical courses.

d) Teaching and learning methods - Evaluation

Delivery	Face-to-face	
Use of information and communications technology	- Free/open source software - Multimedia applications - Eclass - Open courses	
Teaching methods	*Activity*	*Semester workload*
	Lectures	52
	Tutorials	0
	Laboratory exercises	13
	Computational exercises	0
	Individual work	91
	Course total	156
Student performance evaluation	For the theory: Course work 20% and Written final exam 80% or Written final exam 100%. For the laboratory part of the course, individual and / or group papers and written or oral examination or presentation, per exercise and per case study	

e) Suggested bibliography

1. Κ. Καρύμπακας (2014). Ηλεκτρονικά Κυκλώματα, Θεωρία και Ασκήσεις. Θεσσαλονίκη: Χριστίνα και Βασιλική Κορδαλή Ο.Ε.
2. Λουτρίδης Σπυρίδων (2014). Εισαγωγή στα Ηλεκτρονικά. Αθήνα: Α. Τζιόλα & Υιοί Α.Ε.
3. Malvino A., Bates D. (2016). Ηλεκτρονική (8η έκδ.) Αθήνα: Α. Τζιόλα & Υιοί Α.Ε.
4. Λιαπέρδος, Ι. (2015). Εισαγωγή στην Ηλεκτρονική. Αθήνα: Σύνδεσμος Ελληνικών Ακαδημαϊκών Βιβλιοθηκών.
5. Τόμπρας, Γ. (2016). Εισαγωγικά Θέματα Ηλεκτρονικής Αθήνα: Σύνδεσμος Ελληνικών Ακαδημαϊκών Βιβλιοθηκών