COURSE OUTLINE

(1) GENERAL

Name and surname of lecturer	PAPADOPOULOU PANAGIOTA		
SCHOOL	SCHOOL OF TECHNOLOGICAL ENGINEERING		
ACADEMIC UNIT	ELECTRICAL ENGINEERING		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	**BN2**	**SEMESTER**	**2ο**
COURSE TITLE	ELECTRONICS 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**
	LECTURES	3	5
	LABORATORY EXERCISES	2	1
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*	*General Background, Special Background, Skills development*		
PREREQUISITE COURSES:	ELECTRICAL CIRCUITS I		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	GREEK		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	YES, on demand		
COURSE WEBSITE (URL)	http://eclass.teikav.edu.gr/ED200/		

(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 aim and scope of the course is to make students able to learn the basic concepts of electronics, the properties and functions of the various electronic components as well as to be able to analyze, design, and testing various electronic circuits.
In particular aim of the course is to provide to students the basic electronics knowledge for basic electronic components such as diodes, transistors (BJT) and field effect transistors (FET) in order to analyze and design of simple and complex electronic circuits are created by these.
In order to deepen in each section numerous of exercises and problems solved during the lectures. At the same time for better understanding of electronic circuits presented students have the opportunity to analyze the various circuits with the help of simulation programs (Electronics Workbench, etc.) both during the lectures and during the laboratory exercises. The modules of the course are:
Semiconductors. Diodes PN, properties and diode circuits, other types of diodes such as Zener, Schottky, diodes , PIN, Circuits applications such as wave shaping circuits, climbing circuits,

voltage multipliers circuits, rectification and stabilization circuits. Bipolar transistors and circuits, study and design of ac and dc amplifies circuits in CE, CC mode. Field effect transistor (JFET), structure, working principle and circuit analysis, MOSFET transistor.
Upon successful completion of this course students will be able to:
• To distinguish the basic electronic components and know the different ways to connect these elements in the circuit.
• Recognize basic electronic circuits and be able to understand their function.
• Be able to solve an electronic circuit applying laws rules and methodologies that have been taught.
• To calculate characteristic magnitudes of electronic components and to polarize them appropriately considering the design requirements.
• To learn and reads the data sheets for electronic components.
• To perform a simulation program in order to assign the operation of the circuit.
• To use instruments and laboratory equipment to implement electronic circuits and make the relevant measurements.
•To identify errors in simple electronic components and electronic circuits and to be able to provide solutions in order to repair them.
• To design, analyze and otherwise handle an electronic circuit.

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.*
- *Working independently*
- *Team work*
- *Production of new research ideas*
- *Criticism and self-criticism*

(3) SYLLABUS

1. Semiconductors
   1.1. Semiconductors electronic structure
   1.2. Intrinsic and extrinsic semiconductors
   1.3. Semiconductors conductivity
2. Diodes
   2.1. P-n junction
   2.2. P- N diode reverse and forward bias
   2.3. P- N diode current – voltage (I-V) characteristic
   2.4. DC characteristic of p-n diode
   2.5. Zener diode
   2.6. Zener diode regulation
   2.7. Other diodes, Schottky diode, pin diodes etc.
   2.8. Diode circuits
   2.9. Diode circuits applications, wave shaping circuits, climbing circuits, voltage multipliers circuits, rectification and stabilization circuits.
3. Bipolar transistors
   3.1. BJTs structure
   3.2. BJTs DC characteristic, transistor currents and amplification factors
   3.3. BJT in common Emitter mode, circuits analysis and DC characteristics
   3.4. BJT C-E amplifier, dc circuits analysis, design and dc load lines
   3.5. BJT C-E amplifier, ac circuits analysis, design and ac load lines

3.6. BJT in common Collector mode, circuits analysis and DC characteristics
3.7. BJT C-C amplifier, dc circuits analysis, design and dc load lines
3.8. BJT C-C amplifier, ac circuits analysis, design and ac load lines
3.9. BJTs switching mode
4. Field Effect Transistors (FETs)
4.1. FETs structure and operation
4.2. FETs biasing and load lines
4.3. FETs C-S amplifier, dc and ac circuits analysis, design and load lines
4.4. FETs C-D amplifier, dc and ac circuits analysis, design and load lines
4.5. MOSFET transistors structure and operation

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	In classroom
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Lectures and Laboratory Exercises using Power Point presentations. Website of the course in e-class with supporting and auxiliary material which is updated at regular intervals. Software simulation Application. E-mail contact.
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*** Lectures: 39 Laboratory practice: 26 Self study: 100 Course total (27,5 hours / ECTS): ***165***
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.*	**Theory**: Final writing examination where students solve different problems concerning electronic circuits. Laboratory Exercise: I. Individual project work (30%). II. Regular multiple choice questionnaires (20%). III. Final multiple choice writing examination (50%).

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:
- Related academic journals:

- Malvino, A. P., Bates D. J., «Ηλεκηρονική», εκδ. Α. ΤΖΙΟΛΑ Ε., Θεζζαλονίκη, 2012, ISBN: 9789604184101
- Τόμπρας Γιώργος Σ. «Εισαγωγή στην ηλεκτρονική» ΔΙΑΥΛΟΣ Α.Ε. ΕΚΔΟΣΕΙΣ ΒΙΒΛΙΩΝ 2006 ISBN: 978-960-531-192-6
- Millman,J., Grabel,A., «Μικροηλεκηρονική», εκδ. Α. ΤΖΙΟΛΑ Ε., Θεζζαλονίκη, 2013, ISBN:

9789604184248.
- Κ.Α.Καρύμπακα, " Γενική Ηλεκηρονική Τόμος Α", Θεζζαλονίκη, 2001.
- Kaufman-Seidman, «Εγχειρίδιο Ηλεκηρονικής», εκδ. Α. ΤΖΘΛΑ Ε., Θεζζαλονίκη, 1992, ISBN: 960721921X.