COURSE OUTLINE

(1) GENERAL

SCHOOL	SCHOOL OF SCIENCE		
ACADEMIC UNIT	DEPARTMENT OF PHYSICS		
LEVEL OF STUDIES	GRADUATE		
COURSE CODE	**M411**	SEMESTER	**1**
COURSE TITLE	Physics of electronic devices		

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**
	3	5
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:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	GREEK
IS THE COURSE OFFERED TO ERASMUS STUDENTS	YES
COURSE WEBSITE (URL)	www.telecomlab.gr/SHT/m411

(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 of the course is to familiarize postgraduate students with the operating principles of modern electronic devices and the implementation of analog electronic circuits with discrete electronic components.

After the course, students will be able to:

- Understand the technical characteristics of electronic circuits and analyze modern electronic circuits.
- To be able to measure the operating parameters of the circuits and draw conclusions which they analyze in individual work.
- To design and develop circuits on solderless boards (breadboards), which are used to build semi-permanent prototypes of electronic circuits.

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
Teamwork
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…
…….

- Production of free, creative, and inductive thinking.
- Search for, analysis and synthesis of data and information, with the use of the necessary technology.
- Working independently.

(3) SYLLABUS

The course material aims to educate postgraduates in semiconductor elements, electronic devices as well as analog and digital circuits. To achieve this, students will immerse themselves in knowledge that includes:

a) Fundamentals of Ge, Si and GaAs diodes, diode equivalent circuits, Zener diodes, light emitting diodes (LEDs) and their applications.
b) Basic principles of construction and operation of BJT bipolar transistors. Study of common base, emitter, and collector circuits. Analysis of DC and AC bias circuits. Study of the specification sheets of various BJT transistors.

c) Manufacturing methods and technical characteristics of field effect transistors (FET), JFET, MOSFET/MESFET etc.
d) Basic principles of operation of analog and digital converters, timer units and voltage-controller oscillators.

(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*	• Use of ICT in teaching. • Course website maintenance. Announcements and posting of teaching material (lecture slides and notes). • Use of email for information exchange and improved communication with students.
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 nondirected study according to the principles of the ECTS*	

Activity	***Semester workload***
Lectures	39
Study, and analysis of bibliography	35
Laboratory practice	48
Exams	3
Course total	***125***

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.*	• The laboratory practices are marked based on their correctness and completeness (40%). • Final examination, which includes problem solving. The exam papers are evaluated based on the correctness and completeness of answers (60%).

(5) ATTACHED BIBLIOGRAPHY

Suggested bibliography:

-Electronic Devices, Global Edition 10th Edition by Thomas L. Floyd , 2018

-Electronic Principles, 8th Edition; Albert Malvino and David Bates, McGraw Hill, 2016

.-Electronic Devices and Circuits Theory, 10th Edition; Robert I. Boylestad and Louis Nashelsky; Prentice Hall, 2008.