COURSE OUTLINE

(1) GENERAL

SCHOOL	SCHOOL OF ENGINEERING		
ACADEMIC UNIT	DEPARTMENT OF ELECTRONICS ENGINEERING		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	2602005	**SEMESTER**	2
COURSE TITLE	Electronic Component Technology and PCB Design		

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 (ECTS)**
Lectures	2	4
Laboratory	2	
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*	Special Background Course
PREREQUISITE COURSES:	None
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	NO
COURSE WEBSITE (URL)	http://www.electronics.teipir.gr/personalpages/papageorgas/download/2/

(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 successful completion of this course module students possess advanced knowledge, skills and competences in the subject of Electronic Components and PCB Design that enable them to:

- Recognize and identify electronic components
- Identify codes of components
- Components function test
- Design using computer software, analog, digital and hybrid circuits
- Design a printed circuit board
- Implement a printed circuit board

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 free, creative and inductive thinking

(3) COURSE CONTENT

Lectures:

1. Materials I
   Solid, liquid, gas
2. Materials II
   Conductors, insulators, semiconductors and semiconductor characteristics
3. Resistors
   Characteristics of resistors, resistor codes, resistors categories and variable resistors
4. Dielectrics-Capacitors
   Polarization types and electrical properties of the dielectric capacitors, categories of capacitors and characteristics
5. Capacitors
   Dielectric capacitors, electrolytic, IC capacitors, SMD and variable capacitors
6. Coils
   Losses cored coils, induction factor with inductors, coils with core or gap, coils categories, elements of L.H and H.F, special coils
7. Ferrites
   Features of ferrites, ferrites categories regulation of inductance cores and codes, calculate inductance with ferrite core
8. Transformers
   Uses of transformers and transformer operating principles, transformer types and autotransformers
9. Sensors I
   Categories of sensors, traducers and actuators, sensors usage information, use of mechanical stress and pressure sensors
10. Sensors II
    Accelerometer, magnetoresistance, categories, items, usage of temperature sensors
11. Integrated Circuits
    Categories of Integrated Circuits (ICs), SSI, MSI, LSI and VLSI, photolithographic method
12. Printed Circuits Boards (PCB) I
    Printed circuit boards, single- and double-sided
13. Printed Circuits (PCB) II

Flexible PCB and multilayer PCB

Laboratory:

Design and construction of a PCB during the semester.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face lectures
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	• Use of electronic presentation with multimedia content in class, • Student support through the course webpage and the departmental e-learning platform, • Electronic communication of instructors and students, through the course webpage and by e-mail. • Use of special driving software for PCB etching machine.
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*	Lectures, Laboratory experiments, study.

Activity	***Semester workload (hours)***
Lectures	26
Study for lectures	26
Laboratory experiments	26
Report on lab experiments	26
Study and preparation for exams	16
Course Total	***120***

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.*	Final grade = Theory part grade x 60% + Lab part grade x 40% *Theory part grade:* Individual Project (30%): Written examination (70%) Final written examination that includes: • Multiple choice questions • General comprehension questions regarding the electronic components and PCB design *Laboratory part grade:* • Implementation of a project (40%) • Carry out a series of exercises regarding PCB design (60%)

(5) ATTACHED BIBLIOGRAPHY

Recommended Books

1. Karagiannis A., Electronic Component Technology, A. Tziola & Sons, Athens 2001
2. Gikas A., Electronic Components and Materials Handbook, Papasotiriou, Athens 2010
3. Data Books (Philips, National, RS Components, Analog Device, Fairchild Semiconductors, Harris, etc.
4. Lecture notes by the instructor
5. Laboratory notes by the instructor