COURSE OUTLINE

1. GENERAL

SCHOOL	ENVIRONMENT AND AGRICULTURAL ENGINEERING		
ACADEMIC UNIT	NATURAL RESOURCES DEVELOPMENT & AGRICULTURAL ENGINEERING		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	**76**	**SEMESTER**	**7th**
COURSE TITLE	ELECTRONICS-MICROPROCESSORS		

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	2	2
LABORATORY EXERSICES	2	2
TOTAL	4	4
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*	SCIENTIFIC AREA - SKILL DEVELOPMENT
PREREQUISITE COURSES:	• ELECTRICAL ENGINEERING-ELECTRIC MACHINES • MEASUREMENTS AND SENSORS
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	GREEK
IS THE COURSE OFFERED TO ERASMUS STUDENTS	NO
COURSE WEBSITE (URL)	TO BE CONSTRUCTED

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 the course, the student(s) will have:

- **Understanding of the functioning of diodes and bipolar transistors.**
- **Ability to select the appropriate types of diodes and transistors based on their characteristics and the specific requirements of applications.**
- **Ability to conduct analyses of electronic circuits composed of diodes, bipolar transistors, and passive components.**
- **Ability to analyze, design, and implement circuits for rectification, smoothing, and**

stabilization of power supply voltage.

- **Ability to analyze, design, and implement circuits for amplification of low-frequency signals.**
- **Ability to analyze, design, and implement circuits in which current flow is controlled through an electronic switch.**
- **Understanding of the functioning of unipolar transistors.**
- **Understanding of the functional characteristics of unipolar transistors to be able to select appropriate commercial types of transistors based on their characteristics and the specific requirements of applications.**
- **Ability to conduct analyses of electronic circuits composed of diodes, bipolar and unipolar transistors, and passive components.**
- **Ability to design and implement circuits for amplification of DC and low-frequency signals.**
- **Ability to design and implement circuits that require current flow control through electronic switches.**
- **Ability to analyze, design and implement electronic circuits for automation (comparison circuits, PID controllers, etc.) using operational amplifiers.**
- **Familiarity with a wide range of integrated circuits (ICs) and combinational logic systems.**
- **Training in the design of digital electronic systems based on combinational logic.**
- **Ability to use knowledge for detecting circuit faults.**
- **Ability to select the best type of IC based on electrical characteristics for various applications that achieve different objectives.**
- **Understanding the characteristics and operation of sequential logic ICs with extensive scientific and commercial applications.**
- **Ability to design digital sequential systems that achieve digital goals with the smallest possible construction and functional cost, weight, and volume.**
- **Knowledge for fault detection.**
- **Ability to describe with diagrams the ladder of the internal architecture and organization of 8-bit microprocessors.**
- **Ability to select the appropriate implementation of a microcomputer system for various applications, considering the cost, power consumption, and processing speed requirements.**
- **Programming skills of a microprocessor in machine language or symbolic language using appropriate tools.**
- **Ability to interpret and verify the correctness of program results at the system and user level.**

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…*
	……

Searching, analyzing, and synthesizing data and information using the necessary theoretical knowledge and established technologies.

Applying theoretical knowledge in practice.

Working autonomously.

Working collaboratively in a team.

Working in an interdisciplinary environment.

Making decisions.

Promoting free, creative, and inductive thinking.

3. SYLLABUS

Introduction to Electronics. Semiconductors. Energy bands and transport phenomena in semiconductors. Diodes. Diode circuits. Bipolar junction transistors (BJTs). BJT as a switch. BJT as an amplifier. Field effect transistors (FET). Operational amplifiers. Analog electronic circuits. Differential amplifiers and multi-stage amplifiers. Frequency response. Feedback. Output stages and power amplifiers. Analog integrated circuits. Signal generators and waveform generation circuits. Oscillators. Analog filters. MOS digital electronic circuits. Digital filters. Bipolar digital circuits. Boolean algebra and Karnaugh maps. Logic gates. Synchronous and asynchronous sequential circuits. Flip-flops. Counters. Adders. Encoders. Decoders. Registers. Shift registers. Multiplexers. Demultiplexers. Analog-to-digital and digital-to-analog converters. Memories. Microprocessors. Microprocessor architecture. Programming elements for microprocessors.

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 and Communication with Students** • **Laboratory Education**
TEACHING METHODS *The manner and methods of teaching are described in detail.*	

Activity	*Semester workload*
Lectures	60
Laboratory Exercises	60

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*		
	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.*	Written Exam (Theoretical Conclusion): 100% Technical Laboratory Reports: 40% Oral Exam in a laboratory environment: 60%	

5. ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

- Related academic journals: