COURSE OUTLINE

(1) GENERAL

SCHOOL	Engineering		
DEPARTMENT	Electrical and Computer Engineering		
LEVEL OF STUDY	Undergraduate		
COURSE UNIT CODE	3.004	**SEMESTER**	3rd
COURSE TITLE	ELECTRONICS I		

COURSEWORK BREAKDOWN	**TEACHING WEEKLY HOURS**	**ECTS Credits**
Theory (Lectures)	3	3.6
Tutorial/Exercises	1	1.2
Laboratory	1	1.2
TOTAL	**5**	**6**

COURSE UNIT TYPE	Specialized general knowledge/Skills development
PREREQUISITES	General High School Knowledge in Physics, Electrical Circuits I.
LANGUAGE OF INSTRUCTION/EXAMS	Greek (Teaching, Exams) English (Exams) French (Exams)
COURSE DELIVERED TO ERASMUS STUDENTS	YES
WEB PAGE (URL)	https://eclass.hmu.gr/courses/ECE120/

(2) LEARNING OUTCOMES

Learning Outcomes

1. Knowledge of p-n junction based on semiconductor theory.
2. Knowledge of diodes principles (Silicon, Germanium, Zener diode) and their applications in electrical circuits.
3. DC and AC analysis of bipolar junction transistors (basic equations, equivalent circuits). Skills in designing signal amplifiers.
4. Monopolar transistor (FET) (basic equations, equivalent circuits, dc and ac analysis). Skills in designing signal amplifiers.
5. Ability to understanding and analysing (in theory and in laboratory) amplifiers with bipolar (BJT) and monopolar (FET) transistors. Skills in designing single stage amplifiers in analog and integrated circuits.

General Skills

- Search, analysis and synthesis of data and information, using the necessary technologies
- Decision making
- Project design and management
- Autonomous work
- Teamwork
- Exercise criticism and self-criticism
- Promoting liberal, creative and inductive/deductive thinking

(3) SYLLABUS

SYLLABUS

The p-n diode and basic semiconductor theory. Electrical equivalent diode circuits. Basic circuits with p-n and Zener diodes. AC to DC conversion circuits through rectifier circuits. Structure and operating principles of the BJT bipolar transistor: DC polarization, I-V output curves, circuit operating point, basic amplification principles, basic BJT circuits (common emitter, common collector, switch). FETs, field-effect transistors: DC polarization. Analysis and design of basic amplifier devices of bipolar transistors and FET transistors using equivalent small signal circuit models. Understanding of the techniques and procedures to build integrated circuits.

LABORATORY with 5 Exercises

1. I-V curves of p-n and Zener diode
2. Useful diode circuits
3. Simple DC Power Supply (Rectifiers - Smoothing Filters).
4. BJT transistor. DC Polarization and amplification (Common Emitter, Common Collector).
5. FET transistor. DC Polarization and switching operation

(4) TEACHING METHODS - ASSESSMENT

MODE OF DELIVERY	In-Class Face-to-Face
USE OF INFORMATION AND COMMUNICATION TECHNOLOGY	• Use of ICTs in lecturing • Use of ICTs in laboratory exercises. • Use of ICTs for the communication with students via the e-class platform
EACHING ORGANIZATION	

Method description/Activity	Semester Workload
Lectures	39
Laboratory Exercise	26
Tutorials	13
Project (journal/paper reading and theoretical study)	26
Exams	39
Total Contact Hours	**150**

ASSESSMENT METHODS

Evaluation process

1. Written examination 180 minutes (70%)
2. Laboratory performance (20%)
3. Public presentation (10%)

Language of Evaluation: Greek

Evaluation Methods

1. Written Examination with Extended Answer Questions
2. Written Assignment
3. Oral Examination
4. Written Examination with Problem Solving
5. Laboratory Work

(5) RECOMMENDED BIBLIOGRAPHY

1. Electronic Principles, 8th Edition, Malvino A. P., Bates D. J., Publication Tziola, 2016 ISBN 960-418-559-4 (in Greek)

2. Microelectronic Circuits, 7th Edition & CD, A. Sedra, K. Smith, Publication Papasotiriou, 2017, ISBN 960-491-107-3 (in Greek).

3 Electronic Devices and Circuits Theory R. Boylestad and L. Nashelsky Prentice-Hall ISBN 0-13-249517-1