COURSE OUTLINE

(1) GENERAL

SCHOOL	ENGINEERING		
ACADEMIC UNIT	COMPUTER ENGINEERING AND INFORMATICS DEPARTMENT		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	NY106	SEMESTER	2nd
COURSE TITLE	Electic Measurements and Instumentation		

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 and tutorials	1	1
Laboratory exercises	3	3
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).	Total	4

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	General background Specialized general knowledge
PREREQUISITE COURSES:	PHYSICS (NY105)
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	https://eclass.upatras.gr/courses/CEID1073/

(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*

Leactures and Tutorials

Students will learn to

- Understand the errors, uncertainty, and reliability of signal processing.
- Estimate the uncertainty in measurements.

Laboratory Exercises

Students will learn to

- Use the digital oscilloscope in order to measure the charging and discharging of a capacitor in RC circuits, and obtain the time constant: $\tau=RC$ of the circuit.
- Use the digital oscilloscope in order to measure the phase shift between sinusoidal input and output signals in RC circuits.
- Create Lissajous images in a digital oscilloscope in order to estimate the phase difference between sinusoidal input and output signals in RC circuits.
- Use the digital oscilloscope in order to obtain the i-v characteristic of a resistance in a RC circuit.
- Use the digital oscilloscope in order to obtain the i-v characteristic of a diode.

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* *Team work* *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…* *…….*
Working Independently Working in an international environment Working in an interdisciplinary environment Production of new research ideas	

(3) SYLLABUS

Leactures and Tutorials

- **Fundamentals of Electrical Measurements**
  - The standards of electrical quantities referred to the physical phenomena and laws.
- **Uncertainty of Measurements**
  - Errors, uncertainty, and reliability of signal processing.
  - Basic statistical terms and concepts.
  - Methods of evaluation and correction of the uncertainty related to limited accuracy of measuring devices.
  - The estimation of uncertainty in measurements.
- **Recording and Displaying Measuring Instruments**
  - Fundamentals of oscilloscopes.
  - Digital oscilloscopes.
  - Digital multimeters.

Laboratory Exercises

- **Lab 1**
  - The RC circuit.
- **Lab 2**
  - Phase shift measurements
- **Lab 3**
  - Lissajous curves
- **Lab 4**
  - Measurement of i-v characteristic of linear resistor
- **Lab 5**
  - Measurement of i-v characteristic of a diode

(4) TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY
Face-to-face, Distance learning, etc.</td><td>Face – to - face</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
Use of ICT in teaching, laboratory education, communication with students</td><td>Extended use of ICT. Specifically:
There are electronic links with Lecture notes (in Greek)
Main communication with the students is contacted via emails, and all announcements of the course are via eclass.</td></tr>
<tr><td>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</td><td>
<table>
<tr><th>Activity</th><th>Semester workload</th></tr>
<tr><td>Lectures</td><td>12 hours</td></tr>
<tr><td>Tutorials</td><td>10 hours</td></tr>
<tr><td>Study and analysis of bibliography</td><td>50 hours</td></tr>
<tr><td>Laboratory practice</td><td>35 hours</td></tr>
<tr><td>Laboratory reports</td><td>10 hours</td></tr>
<tr><td>Laboratory Exams</td><td>1 hour</td></tr>
<tr><td>Course total</td><td>118 hours</td></tr>
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</td></tr>
<tr><td>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.</td><td>The language of evaluation is Greek. The evaluation of laboratory exercises is based on:
the functionality of the circuits and components examined in every exercise, oral examination during the laboratory work, and the report of the experimental measurements and results in every exercise.
A final examination of one hour, where every student is examined separately on the lab bench. Marking is depending on his ability to perform selected measurements with a digital oscilloscope on a given circuit, and an oral examination after the end of his measurements.</td></tr>
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(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

PRINCIPLES OF ELECTRICAL MEASUREMENT, S Tumanski, CRC Press, Taylor & Francis Group

- Related academic journals:

- IEEE Transactions on Circuits and Systems
- IEEE Transactions on Education