COURSE OUTLINE

(1) GENERAL

SCHOOL: SCHOOL OF ENGINEERING

ACADEMIC UNIT: DEPARTMENT OF ELECTRONICS ENGINEERING

LEVEL OF STUDIES: UNDERGRADUATE

COURSE CODE: 2602006

SEMESTER: 2

COURSE TITLE: Measurements

INDEPENDENT TEACHING ACTIVITIES

<table>
<thead>
<tr>
<th>WEEKLY TEACHING HOURS</th>
<th>CREDITS (ECTS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>2</td>
</tr>
<tr>
<td>Laboratory</td>
<td>2</td>
</tr>
</tbody>
</table>

Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).

COURSE TYPE: General Background Course

PREREQUISITE COURSES: None

LANGUAGE OF INSTRUCTION and EXAMINATIONS: Greek

IS THE COURSE OFFERED TO ERASMUS STUDENTS: NO

COURSE WEBSITE (URL): http://electronics.teipir.gr

(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 Measurements that enable them to:

- assess the impact of systematic errors arising from equipment and component tolerances in a circuit or device,
- evaluate random errors and the methods needed to estimate them,
- handle basic electronic instruments and use them for measuring basic electrical quantities and circuits,
- design a simple measuring circuit,
- program in an environment suitable for measurement processing,
- evaluate a basic measuring device and identify possible causes of errors and tolerances.
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
- Working independently
- Team work

(3) COURSE CONTENT

Theory
1. Physical quantities, units, unit systems, standards, metrology and quality control.
2. Error theory in physical measurements, systematic and random errors.
3. Basic electrical instruments. Rectifier-type and true-RMS instruments.
4. AC and DC bridge measurements.
5. Introduction to electronic measurement systems and data acquisition.
6. Electronic instruments (oscilloscopes, generators, etc).

Laboratory
1. Use of basic instruments
2. Instruments calibration
3. DC-AC multimeters
4. Power measurement
5. Bridge circuits
6. Development of virtual instruments through graphical programming

(4) TEACHING and LEARNING METHODS - EVALUATION

<table>
<thead>
<tr>
<th>DELIVERY</th>
<th>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</th>
<th>TEACHING METHODS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Face to face lectures</td>
<td>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 software for measurement applications and virtual metering equipment.</td>
<td>Lectures, Laboratory experiments, study.</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Activity</th>
<th>Workload (hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>26</td>
</tr>
<tr>
<td>Study for lectures</td>
<td>26</td>
</tr>
<tr>
<td>Laboratory experiments</td>
<td>26</td>
</tr>
<tr>
<td>Report on lab experiments</td>
<td>26</td>
</tr>
<tr>
<td>Study and preparation for exams</td>
<td>16</td>
</tr>
<tr>
<td>Course Total</td>
<td>120</td>
</tr>
</tbody>
</table>

**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 course grade = Lectures part grade x 60% + Laboratory part grade x 40%,

Lectures part grade results from:

Final written exam on all taught material. The exam includes:

- Multiple choice questions,
- Development questions,
- Problem solving involving circuits and measurement devices.

Laboratory part grade results from:

- Written test on two groups of lab experiments.
- Reports on lab experiments
- Oral grade from lab participation

(5) ATTACHED BIBLIOGRAPHY

**Essential reading**

Lecture notes by the instructor.

**Recommended Books**

- NORTHROP, R. B. Introduction to Instrumentation and Measurements, CRC Press.
- KULARATNA, N., Modern Electronic Test and Measuring Instruments, IEE series.