EEE.7-1.9 Measurement Technology

COURSE OUTLINE

1 GENERAL

SCHOOL	Engineering		
DEPARTMENT	Electrical and Electronics Engineering		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	EEE.7-1.9	**SEMESTER**	7
COURSE TITLE	Measurement Technology		

INDEPENDENT TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**	**CREDITS**
Lectures	2	4
Laboratory	1	
Total	3	

COURSE TYPE:	Specialization Course
PREREQUISITE COURSES:	Electrical Measurements
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek (official)
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	www.eee.uniwa.gr

2 LEARNING OUTCOMES

Learning outcomes

This course aims to introduce the student, theoretically and practically, in measuring procedures for determining the true value of electrical and non-electrical quantities, taking into account the reentrant errors.
The student must develop the capacity for independent implementation of integrated measuring procedures necessary for the research and the overall production process.
Upon successful completion of the course the student will be able to:

- examine complex electrical and electronic circuits.
- describe and interpret the phenomena that occur in complex electrical and electronic circuits.
- apply the basic knowledge of electrical engineering and electronics in resolving complex circuits.
- associate the results of theoretical analysis with those of the processing of experimental measurements in a circuit.
- design and construct circuits.
- propose solutions to technical issues.

General Competences

The course aims at fostering the following capabilities:

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Adapting to new situations
- Teamwork
- Criticism and self-criticism

3 COURSE CONTENT

A. THEORY

- Measurement of real, reactive and apparent power in AC single - and multi-phase (three-phase) systems.
- Single-phase and multi-phase wattmeters.
- Measurement of power factor (cosϕ).
- Phase sequence in three-phase system.
- Electrical energy measurement.
- Electronic/digital measurements - Digital instruments (voltmeters - ammeters - ohmmeters - wattmeters - reactive power meters - electricity meters).
- Comparisons of classic and digital measurements.
- Measurements of non-electrical quantities.
- Sensors and transducers (voltage - intensity - load power - length - bending torque - temperature - ph - speed - air - containing gases - humidity - mechanical stress etc).

B. LABORATORY

- Laboratory safety regulations.
- Real power measurement.
- Electrodynamic voltmeter.
- Impedance measurement.
- Maxwell bridge.
- Power factor measurement.
- Three-phase real and reactive power measurement.
- AC measurements with dual beam oscilloscope.
- Voltage measurement of a dimmer.
- Electrical energy measurement.
- Phase sequence determination.
- Recording instruments.
- De Sauty bridge.
- Power factor improvement.
- Temperature measurement.
- Moisture Measurement.
- Sound level measurement.

• Illuminance measurement.

4 TEACHING and LEARNING METHODS - EVALUATION

DELIVERY	Lectures, laboratory practice
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY	• Use of digital repositories of learning objects • Use of software (e.g. Matlab, Spice, Mathematica, Mathcad)
TEACHING METHODS	***Activity Semester workload*** / ***Activity Semester workload*** Lectures 26 Study 55 Laboratory exercises 13 Group Technical Reports 26 ***Total*** 120
STUDENT PERFORMANCE EVALUATION	I. Final written exam of theoretical part includes (60% of the total score): - Solving theoretical problems relating to the subject of the course - Description / evidence theory data - Interim written assessments during the semester. II. Examination laboratory part comprising (40% of the total score): - Weekly individual written exam - Weekly group technical reports - Written final exam - Practical final examination

5 ATTACHED BIBLIOGRAPHY

1. Πετρίδης Β. (2000). ΣΥΣΤΗΜΑΤΑ ΜΕΤΡΗΣΕΩΝ, Θεσσαλονίκη: University Studio Press.
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3. Πράπας Δ. (2004). ΤΕΧΝΟΛΟΓΙΑ ΜΕΤΡΗΣΕΩΝ, ΑΡΧΕΣ & ΕΦΑΡΜΟΓΕΣ, Θεσσαλονίκη: ΤΖΙΟΛΑΣ
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8. Hayt Jr. W. H. and Kemmerly J. E. (1991). ΑΝΑΛΥΣΗ ΗΛΕΚΤΡΙΚΩΝ ΚΥΚΛΩΜΑΤΩΝ. 4 η Έκδοση. Θεσσαλονίκη: ΤΖΙΟΛΑΣ
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11. Gardner, J.W., Μικροαισθητήρες – αρχές και εφαρμογές, (μεταφρασμένο), Εκδ. Τζιόλα, Αθήνα 1994.
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