COURSE OUTLINE

(1) GENERAL

SCHOOL	OF SCIENCES		
ACADEMIC UNIT	PHYSICS DEPARTMENT		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	509	**SEMESTERS**	6, 8
COURSE TITLE	MEASUREMENTS AND AUTOMATIONS WITH COMPUTER		

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**
	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*	SPECIAL BACKGROUND/SKILLS DEVELOPMENT
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	GREEK
IS THE COURSE OFFERED TO ERASMUS STUDENTS	YES
COURSE WEBSITE (URL)	http://ecourse.uoi.gr/course/view.php?id=112

(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*

In this course through the theoretical training and practical exercise, the student acquires the necessary skills for understanding the computer architecture, digital electronics, the operation of various types of sensors and methods and how to manipulate measurement systems with a computer. A specialized training is performed of the software package LABVIEW with practical exercises on the Lab with the use of a computer for each student. Especially, with the successful completion of the course the student will:

- Acquire knowledge for the hardware architecture of modern computers. He (she) will be able to recognize the various parts of a computer and their operation and use
- Will acquire knowledge of sensors used on various physical measurements (i.e. temperature, pressure, level, etc.) and their interconnection with data acquisition systems and computers

- Will learn a popular software package used worldwide on measurement and information systems. He (She) will learn to program with pictograms and solve specific problems of automation systems and sensor interconnection with data acquisition units and computers
- Will be familiar with the management of control and automation systems in real time, to display the measurements graphically on a computer monitor (GUI) and be able to interfere on-site (i.e. open/close switches). He (she) will be able to perform statistical analysis of data and display the results on a computer monitor
- Will obtain skills in computer programming, information management and use of modern digital electronics. He (she) will be able to design, develop and combine complex logic problems and apply practical solutions

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…*
	…….

Search for analysis and synthesis of data and information with the use of the necessary technology. Working independently. Adapting to new situations. Production of free, creative and inductive thinking. Production of new research ideas. Project planning and management.

(3) SYLLABUS

Detectors, Sensors and transducers. Analogue and Digital Electronics. Analog to Digital and Digital to Analog signal conversion. Digital measurement devices. Analog measurement devices. Computer hardware architecture. Application development environment. Basic sampling systems. Techniques for interconnecting devices and sensors with computer. The LABVIEW software package. Use of LABVIEW to interconnect and communicate a computer with various electronic devices and sensors. Data acquisition and image processing.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face teaching, practice on PCs
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	The lectures are presented in the class with projector. The practical exercises are performed in the Lab on Personal Computers, one for each student. The Communication with students and the availability of the necessary material (notes,

	bibliography, etc.) is also performed via the asynchronous learning system (ecourse).

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

Activity	*Semester workload*
Lectures (Theory)	26
Laboratory practice	26
Study of Bibliography	26
Self-Study	19
Written Exams	3
Course total	**100**

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 exams at the end of the course focusing on the understanding of the theory and ability to solve technical problems with the use of the software package instructed (60%).
Each student is performing an individual report at home on a selected subject. This involves development, design and solution in the context of the software package instructed (i.e. LABVIEW). The report is delivered before the final exams. It is prerequisite for passing the course and is counted on the final grade (40%).

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:
- Related academic journals:

- LABVIEW FOR ENGINEERS, DAQ SYSTEM PROGRAMMING, 3nd Edition, ISBN 978-960-418-448-4, K.KALOVREKTIS, TZIOLAS PUBLICATIONS (Greek Edition)

- ELECTRICAL MEASUREMENTS AND SENSORS, ISBN: 978-960-461-331-1, K.KALAITZAKIS & E.KOTROULIS, KLIDARITHMOS PUPLICATIONS (Greek Edition)