COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Engineering
ACADEMIC UNIT	Department of Naval Architecture
LEVEL OF STUDIES	Undergraduate
COURSE CODE	NAOME1357

COURSE CODE	NAOME1357	**SEMESTER**	7th
COURSE TITLE	**SENSOR TECHNOLOGY**		

INDEPENDENT TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**	**CREDITS (ECTS)**
Lectures	3	4

COURSE TYPE *general background, specialbackground, specialised general knowledge, skills development*	Specialized
PREREQUISITE COURSES:	NAOME1221 - Fundamentals of Electrical engineering)
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	https://eclass.uniwa.gr/courses/NA239/

(2) COURSE GOALS / LEARNING OUTCOMES

The proper operation of any modern ship relies on the information provided by the onboard measuring devices that quantify critical performance parameters. The main objective of the course is to introduce students to the principles of operation and basic characteristics governing advanced technology measuring devices, i.e. sensors employed on a modern vessel, such as temperature sensors, pressure sensors, acceleration sensors, magnetic sensors, proximity sensors, gyroscopes etc.

(3) COURSE CONTENT / SYLLABUS

- Fundamentals of measurement systems - main characteristics of sensing devices (IFS,OFS, sensitivity, drift, transfer function, etc.)
- Fundamentals of microelectronics/microsensors (fabrication techniques, development stages etc.)
- Principle of operation for basic sensing elements employed on board ship (Resistance Temperature Sensors (RTDs), thermocouples, pressure sensors, flow sensors, magnetic (Hall) position sensors, etc.)
- Characteristics and technical specifications of typical industrial sensors employed onboard- examples of application
- Sensor signal conditioning circuits (voltage/current divider, Wheatstone bridge configurations, voltage follower/buffer, comparator/Schmitt trigger, Analog to Digital Converters (ADC), Digital to Analog Converters (DAC), multiplexing/demultiplexing circuits)

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY Face-to-face, Distance learning, etc.	Face-to-face
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY Use of ICT in teaching, laboratory education, communication with students	• Use of ICT in teaching • Asynchronous e-learning support through "Open eClass" platform
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*	<table><tr><td>*Activity*</td><td>*Workload (hours)*</td></tr><tr><td>Lectures</td><td>39</td></tr><tr><td>Study of Lectures</td><td>78</td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td>Course total</td><td>**117**</td></tr></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*	Lectures: Final written examination (100%)

(5) ATTACHED BIBLIOGRAPHY

1. Αισθητήρες μέτρησης και ελέγχου, Κ. Καλοβρέκτης, Ν. Κατέβας, εκδόσεις Τζιόλα, 2018
2. Ηλεκτρικές μετρήσεις και αισθητήρες, Κ. Καλαϊτζάκης, Ε. Κουτρούλης, εκδόσεις Κλειδάριθμος, 2010
3. Μικροαισθητήρες: Αρχές και Εφαρμογές, J.W. Gardner, εκδόσεις Τζιόλα 2000
4. Handbook of modern sensors, J. Fraden, Springer, 2004
5. Microsensors, MEMs, and Smart Devices, J.W. Gardner, V.K. Varadan, O.O. Awadelkarim, Wiley, 2001
6. Modern control systems, R. C. Dorf, R.H. Bishop, Prentice Hall, 2010
7. IEEE Journal of Microelectromechanical Systems, ISSN: 1057-7157
8. Sensors and Actuators A: Physical, Elsevier, ISSN: 0924-4247
9. SAE Technical papers, ISSN: 0148-7191