Università degli Studi della Basilicata
Scuola di Ingegneria

COURSE: Sensors, Detectors and Electronic Devices				
TEACHER: IULA ANTONIO				
e-mail: antonio.iula@unibas.it		website:		
Language IT				
ECTS: 9	n. of hours:80	Academic year: 2015/2016	Campus: Potenza	Semester: annual

TOPICS

The aim of the course is to describe the working principle of some physical sensors, including piezoelectric transducers, sensors and actuators. Some application fields, where such sensors are employed, are investigated as well. General concepts of Biometrics are introduced and some biometric systems based on Ultrasound are analyzed.

TEACHING METHODS (please tick one or more options)

□ xTheoretical lessons
□ Tutorials in classroom
□ xTutorials in laboratory
□ Pxroject works
□ Technical visits
Other activities (please specify) _____

TEXTBOOKS

Wayman, J.L.; Jain, A.K.; Maltoni, D.; Maio , Biometric Systems: Technology, Design and Performance Evaluation, Springer ,2005.
L. Kinsler, A. R. Frey, A. B. Coppens, Fundamentals of Acoustics, John Wiley & Sons. 1999.

ON-LINE EDUCATIONAL MATERIAL

web address:

LEARNING OUTCOMES

Both methodological and practical approaches are followed. The methodological part is dedicated to the study of the working principle of the devices through simplified analytical models. Knowledges acquired will be applied through numerical exercises with the use of commercial software (ANSYS, MATLAB) to allow students design and simulation of devices and systems.

REQUIREMENTS

Courses of Electronics, Numerical Models for Fields and Circuits.

EVALUATION METHODS (please tick one or more options)

□ Intermediate verifications
□ Written examination
□ xDiscussion of a project work
□ Practical test
□ xOral examination
Other methods (please specify) _____

DETAILED CONTENT

Devices for ultrasound generation. Fundamental of Acustics. Propagation of acoustic waves. Acoustic impedance. Piezoelectricity. Piezoelectric transducers. Main application of Ultrasounds. Analytical and Finite Element MOdelling of ultrasound transducers.

Systems for Ultrasound Imaging. Basic principles for acoustical image generation. AScan, BScan and CScan images. CScan mapping.

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Introduction to biometric systems. Goals of biometric systems, to prove own identity, people identification, Main biometric characteristics. Advantages of the biometric recognition. Field of application. Recognition modality; verification and authentication modes. Classification of biometric applications. Architecture and Performance of a biometric system. Template and matching. Errors in biometric systems. Evaluation parameters of a biometric system. Example of biometric characteristics: fingerprint, palmprint, vein pattern, hadn geometry.

EXAMINATION SESSIONS (FORECAST)
13/7/2016, 27/7/2016, 14/9/2016, 28/9/2016, 8/2/2017, 22/2/2017

SEMINARS BY EXTERNAL EXPERTS YES x NO □

FURTHER INFORMATION