

DESCRIPTION OF THE COURSE

Name of the course: Measuring Systems	Code: BIE49	Semester: 5
Type of teaching: Lectures and laboratory work	Lessons per week: L – 2 hours; LW – 1.5 hours	Number of credits: 5

COURSE STATUS IN THE CURRICULUM: Compulsory for the students specialty Industrial Engineering BEng programme of the English Language Faculty of Engineering.

AIMS AND OBJECTIVES OF THE COURSE: To provide the students knowledge in measuring systems, the application of microprocessors and the improvement of the measurement systems metrological characteristics as well as knowledge in basic mechanical, electronic and optical instruments and their application in engineering metrology.

DESCRIPTION OF THE COURSE: The main topics concern: Measuring systems – designation and structure. Static characteristics and generalized model of the system's elements. Dynamic characteristics and dynamic errors. Electrical loading, equivalent structures. Signals and noise. Methods for the decreasing the errors due the noise and ambient factors. Sensors, types and field of application. Application of the microprocessors, multichannel input and output of analogue and digital information interfaces and program control. Programmable timers. Measurement of geometric quantities. Error sources. Measuring systems and instruments: mechanical, pneumatic, electronic. Measurement of angles, form and position deviations. Measurement of surface topography. Coordinate measuring systems, coordinate metrology. Optical systems theory. Types of optical systems, main properties and characteristics. Optical systems for the measurement of linear and angular dimensions: microscope, micro-alignment telescope, autocollimators, profile projectors, comparators, goniometers, spherometers. Laser measuring systems: interferometers, alignment systems, diffraction measuring systems. Fibre optic sensors.

PREREQUISITES: Physics, Electrical engineering, Electronics, Computing, Measurement and instrumentation.

TEACHING METHODS: Lectures, using transparencies and video, case studies, laboratory from laboratory manual, work in teams, protocols preparation and defence.

METHOD OF ASSESSMENT: Two two-hour assessments at the end of semester (80%) plus laboratories (20%).

INSTRUCTIONAL LANGUAGE: English.

BIBLIOGRAPHY:

1. John Bentley. Principles of Measurement Systems, Longman, Scientific @ Technical. 1992;
2. Doebelin E.O. Measurement Systems, Application and Design, IV edition, McGraw-Hill Publishing Company, 1990, ISBN 0-07-017338-9;
3. Galyer J. F.W., C. R. Shotbolt, Metrology for Engineers., Cassel Publishers Limited, London, 1990, ISBN 0-304-31844-2;
4. Anthony D. M. Engineering metrology. Pergamon Press, Oxford, 1992.