Study program / course: Mechanical engineering

Type and level of study: Master academic studies

Course: Theory and Techniques of Measurements

Lecturers: Radulović J. Jasna, Milan S. Matijević

Status of course: Elective, joint for modules M_5 and M_7, III semester

Number of ECTS: 6

Precondition: None

The objective of course

Getting to know the theory of measurement, methods of measurement and measuring equipment for measuring the basic physical quantities. The selection of measuring sensors and corresponding measuring equipment for measuring the different physical quantities. Assessment of measurement errors and processing of measurement results.

The outcome of course

At the end of course the students should know: to select the appropriate measurement equipment for measuring the basic physical quantities; to measure the basic physical quantities: position, distance, speed, acceleration, strain, force, torque, pressure, flow, temperature; to process the results of measurement and to estimate measurement errors.

Syllabus

Theoretical study

Measurement standards. Measurement errors. Processing of measured data - mathematical processing, spreadsheet and graphical representation. Basic structural and metrological characteristics of measurement instrumentation. Basic electrical connection of sensor - current, voltage, differential. Measuring bridges. Measuring amplifiers. Modems, voltage and frequency converters, signal converters. Measuring indicators and recorders. Computer aided measuring systems. Measurement of length, linear and angular displacement. Measurement of mechanical strains and forces. Measurement of torque. Measurement of speed and acceleration during linear and rotational movements. Measurement of mechanical power. Measurement of shock and vibration. Pressure measurements. Measurement of liquid level. Flow measurement. Measurement of temperature. Measurement of humidity.

Practical Studies:

Measurement of displacement, strain, force, acceleration, pressure, flow, temperature. Within the framework of study research, the students will be qualified for basic research in the area of this course.

Recommended reading

1. Grujović, A.: "Tehnička merenja I", Kragujevac, 1999.
2. Grujović, A., Grujović N.: "Tehnička merenja II", Kragujevac, 2005.
3. Grujović, A., Grujović N.: "Tehnička merenja III", Kragujevac, 2005.

The number of hours of active teaching:				Other classes:
Theory: **3**	Practical classes: **1,4**	Other forms of teaching: **0,6**	Research study: **0**	**1**

Methods of teaching

Lectures, oral exercises, laboratory exercises

Evaluation of knowledge

Pre-final exam obligations	points	Final exam	points
Activities during the classes:			
Practical classes:	**20**	Oral exam	**30**
Colloquiums(s) :	**30**		
Seminar(s) :	**30**		