

Study: Physics			
Type and level of studies: Bachelor studies			
<b>Course name: Metrology and Measurement Result Processing</b>			
Lecturer: <b>Branko Drljača</b>			
Status: Compulsory			
ECTS: 4			
Attendance prerequisites: Mechanics and Thermodynamics 1,2; Informatics			
<b>Course aims</b>			
The course aims to provide students with basic knowledge about the principles of measurement through error, result and experimental data processing.			
<b>Course outcome</b>			
The students have learned how to present measurement results correctly. They are familiar with the basics of processing results of physical experiments. They can independently and successfully conduct statistical data gathering (collecting and presenting) within their experimental work. The students are familiar with the application of the International System of Units in science and technology. They have grasped error estimation and are able to use computers for experimental data processing.			
<b>Course content</b>			
<i>Theoretical part</i>			
Measurement. The role of experiments in physics research. The principles of performing physical experiments. Systems of physical quantities. Relationships between physical quantities. History measure and unit. The international system of units. Dimensional analysis. Modern methods of measurement result processing. Statistical analysis of random errors. Mean value and standard deviation. Mean unreliability. Accuracy, repeatability and reproducibility. Total measurement uncertainty. Systematic errors of measuring transducers. Errors in indirectly measured quantities. Random error propagation functions: Gaussian, Chi-square, Student's Chi-square test. Describing random measurement signals. Amplitude distribution function. Autocorrelation. Cross-correlation function. Graphical presentation of experimental data. Statistical methods for processing measurement results. Sampling theory in the processing of measurement results. Least-squares method. Computer application in data processing.			
<i>Practical Part:</i>			
COMPUTATIONAL EXERCISES: Computational exercises related to processing measurement results and errors.			
PRACTICAL EXERCISES ON A COMPUTER: Practical exercises related to applying acquired knowledge about measurement result processing and measurement error analysis.			
<b>Literature</b>			
2. J. Сливка, М. Терзић, Обрада резултата физичких експеримента; Универзитет у Новом Саду, (Нови Сад: Мп Стилос), 1995.			
3. G. Dimić i M. Mitrinović, Metrologija u fizici - srednji kurs, Gradjevinska knjiga, Beograd, 1991.			
4. L. Kirkup: Data analysis with Excel: an introduction for physical scientific, Cambridge university press, 2002			
<b>Number of active classes</b>			Other classes
Lectures: 2	Practical classes: 1	Other forms of teaching:	
<b>Teaching methods</b>			
Lectures (2 classes per week during the semester), computational exercises (1 class per week during the semester).			
<b>Assessment (maximum 100 points)</b>			
<b>Course assignments</b>	<b>points</b>	<b>Final exam</b>	<b>Points</b>
Lectures	10	Written exam	30
Practical classes	10	oral exam	30
Practical work	20	.....	
Total	40		60