Study program	Level of studies		First cycle	
	Study program name		**Physics Education**	
Course name	**PHYSICAL MEASUREMENTS I**			
Course ID	Semester	Course status	ECTS credits	L+E
PHY1611	**I**	**MANDATORY**	**6**	**3+2**
Lecturer				
Aims and intended learning outcomes	Course objective is to familiarize students with different experimental techniques and measuring methods of physical quantities as well as to develop their skills to independently conduct experiments, acquire and process data. Learning outcomes: 1. Understands experimental techniques for examination of physical quantities in the fields of mechanics, thermal science and vacuum technique 2. Is familiar with basic elements of vacuum system and their usage 3. Can independently make assessments and calculations in order to plan an experiment as well as to correctly process results of the experiment			

Course content

Importance of measurements in physics. Measurements and errors. International System of Units-definitions of base units. Classification of errors. Mean value. Direct measurements errors. Indirect measurements errors. Normal distribution. Data analysis based on normal distribution of random errors. Graphical analysis of data. Least square method. Measurements in mechanics. Measurements of mass. Cavendish experiment. Methods for measurements of acceleration due to gravity. Methods for determination of elastic properties. Tensometers. Methods for determination of torsion module. Methods for determination of moment of inertia. Temperature measurements. Formation of temperature scale. Types of thermometers. Thermocouples. Thermostats. Introduction to vacuum technique. Elements of the vacuum system. Production of vacuum. Types of vacuum pumps. Measurement of vacuum. Vacuum gauges.

Student workload (hours)		Grading	
Lectures and Exercises	75	Assessment method	Points
Exam preparation	75		
Assignments		Midterm exam	50
Consultation	150	Final exam	50
Total		Total	100

Literature

1. T. Čajkovski, D. Čajkovski: Fizikalna mjerenja, I i II, skripta
2. V. Vučic: Mjerenja u fizici, Naučna knjiga, Beograd, 2003.g.
3. S. Marić, Fizika, Svjetlost, Sarajevo, 2003. g.
4. A. Saveljev, Fizika I i II
5. W. F. Sears: Mehanika, talasno kretanje i toplota
6. F.W.Sears: Elektricitet i magnetizam, Naučna knjiga, Beograd, 1963.
7. G. Dimić, M. Mitrinović: Metrologija u fizici, Građevinska knjiga Beograd 1990.g

Remarks