

Study program	Level of studies		First cycle	
	Study program name		Physics Education	
Course name	PHYSICAL MEASUREMENTS II			
Course ID	Semester	Course status	ECTS credits	L+E
PHY2511	II	MANDATORY	5	2+1
Lecturer				
Aims and intended learning outcomes	Main course aims are to familiarize students with the different techniques and methods of physical quantities measurement, as well as to develop skills of experiment realization, data collection and solving of problems in measurements and testing. By completing this course, students will gain fundamental knowledge about measurements of the electrical, optical and acoustical quantities. Also, students will understand the work principle of electrical measurements devices, and know how to use them properly as well as to independently estimate and evaluate the necessary calculations in the planning of the experiment.			
Course content				
Measurements in electromagnetism: Main terms and definitions. Electromechanical instruments for measurement of current and voltage. Moving coil instrument. Galvanometers. Motion of moving coil in a galvanometer. Ballistic galvanometer. Moving iron instruments. Electrical measurements of non-electrical quantities. Sensors. Analogue and digital measurements. Oscilloscope. Methods for the measurement of electrical resistance. U-I method. Wheatstone bridge. Measurement of low resistance. Substitution method. Electrical shunt. Universal Ayrton shunt. Ammeter as voltmeter. Ohmmeter. Measurement of the internal resistance of galvanic cells. Potentiometers. Compensation method. Wulf electrometer. Methods for the measurement of electrical capacitance. Thomson's method. De Sauty's method. A.C. bridges. Measurement of capacitance by Schering's bridge. Measurement of capacitance by Wien's bridge. Robinson's frequency bridge. Owen's bridge for measurement of inductance. Measurements in Optics: Basic terms and definitions. Methods for measuring the speed of light. Methods for measuring refractive index. Photometry: Basic terms and definitions. Illumination of a surface by point light source. Photometers. Visual photometers. Objective photometers. Acoustics: Basic terms and definitions. Measurement of sound velocity. Measurement of Galton's whistle frequency by Quincke's tube.				
Student workload (hours)		Grading		
Lectures and Exercises	45	Assessment method	Points	
Exam preparation	30	Homework	10	
Assignments	20	Midterm exam	50	
Consultation	30	Final exam	40	
Total	125			
		Total	100	
Literature				
1. S. Sulejmanović, A. Salčinović Fetić: Fizikalna mjerenja: primjeri mjerenja iz elektromagnetizma, optike i akustike, PMF Sarajevo, 2016. 2. F.W.Sears: Elektricitet i magnetizam, Naučna knjiga, Beograd, 1963. 3. G. Dimić, M. Mitrinović: Metrologija u fizici, Građevinska knjiga Beograd 1990. 4. S. Marić, Fizika, Svjetlost, Sarajevo, 2003.				
Remarks				
Midterm exam – 9 th week of classes				