Program	Level of studies		First cycle	
	Program name		Physics Education	
Course name	OSCILLATIONS, WAVES AND FUNDAMENTALS OF THERMODYNAMICS			
Course ID	Semester	Course status	ECTS credits	L+E
PHY2711	II	MANDATORY	7	3+3
Lecturer	Prof. dr. Elvedin Hasović			
Aims and intended learning outcomes	The goal of the course is to give students basic knowledge about oscillatory motion, mechanical waves, as well as the laws of thermodynamics land their application. At the end of the course the student should be able to: -describe the oscillatory motion of a harmonic oscillator; -understand the concept of wave motion and explain the interference and diffraction of waves; - apply the laws of thermodynamics; - solve numerical and conceptual problems in the topics of oscillations, waves and thermodynamics.			

Course content

Oscillatory motion. The energy of a harmonic oscillator. Damped oscillations. Driven oscillations. Resonance. Travelling waves. Speed of a wave. Energy of a wave. Doppler effect. Wave diffraction. Wave interference. Sound waves. Thermodynamic systems and thermodynamic parameters. Temperature. Ideal gas. Ideal gas equation. Thermal expansion. Internal energy. Heat. Work. The first law of thermodynamics. Heat capacity. Adiabatic processes of ideal gas. Phase changes. The second law of thermodynamics. Heat engines. Heat pumps. Carnot's cycle. Carnot's theorem. The Clausius Theorem. Entropy. Molecular-kinetic theory of gases. Degrees of freedom. Absolute temperature from the point of view of molecular-kinetic theory. Distribution of energy by degrees of freedom. Maxwell-Boltzmann distribution. Transport phenomena in gases. Viscosity of gases. Thermal conductivity of gases. Diffusion of gases.

Student workload (hours)		Grading	
Lectures and Exercises	90	Assessment method	Points
Exam preparation	85	Course Test	50
Total	175	Final Exam	50
		Total	100

Literature

1. Lecture Notes.
2. L. Tanović, N. Tanović, *Fizika - mehanika, oscilacije, talasi*, Sarajevo: Svjetlost, 1990
3. E. Hadžiselimović, *Osnovi termodinamike i molekularne fizike*, Tuzla : Bosnia Ars, 2005
4. L. Tanović, N. Tanović, *Fizika - osnove termodinamike i molekularno-kinetičke teorije gasova*, Sarajevo: Svjetlost, 1988
5. S. Bikić, *Zbirka riješenih zadataka iz fizike*, Zenica : Dom štampe, 1998
6. D. Halliday, R. Resnick, and J. Walker, *Fundamentals of Physics,* Wiley, Hoboken, NJ, 2013.

Remarks