Title of Course	**Physics II**		
Semester	**Autumn/Spring**		
Teaching Hours per Course:	**Total**	**- Lectures:**	**- Tutorials:**
	45	15	30
ECTS Credits	4		

The content of education	
Aims of Course	Student has knowledge of vibration physics of mechanical, electrical and atomic systems and wave motion in elastic media. He can describe analytically and solve motion equations for simple, damped and forced vibrating systems. Student is able to calculate the frequency of natural vibrations of vibrating systems. Student is able to carry out a computer simulation of a vibrating system, eg in MATHCAD or Matlab. He can describe analytically the propagation of waves in a springy medium and calculate the quantities characterizing this motion. He is able to describe analytically interference and wave diffraction
Program	Dynamic equation of motion, equations depending on position, velocity and time, motion with resistance force, Lagrange equation and Newton equation. Computer simulation of motions - examples of numerical analysis. HARMONIC VIBRATIONS Mechanical, electric, atomic and nuclear oscillator. Equation of vibration . Mechanical oscillator and vibrating electric circuit. Vibrations of the diatomic molecule. Computer simulation of vibrations of complex systems. Coherent linear vibrations. Vibrations mutually perpendicular. Examples of folding vibrations with different amplitudes and initial phases. Figures of Lissajous. Equation of damped harmonic motion. Weak suppression. Logarithmic damping decrement Strong and very strong damping Critical damping Computer simulation of vibrating damped systems - numerical analysis FORCED VIBRATIONS Resonance. Resonance curve . Computer simulation of forced vibrations - numerical analysis. WAVES IN ELASTIC MEDIUM Phase and group speed. Running and standing waves. Wave dispersion.
Conditions of completion	An extended essay using computer simulations.
Teacher	Dr Adam Leszczyński