Syllabus

Course title
Physics

faculty	**Field of study:**	Physics, Materials Science
	Specialisation:	all
	Level of study:	Undergraduate and graduate
	System of education:	Full-time and extra-mural

Proszę wpisać propozycje semestru (semestrów) w których przedmiot powinien być realizowany.

Course obligatory / optional				**ECTS points**:7			
Semester	No. of hours	L	**C**	P	Lab	Seminar	Completion/Exam
Fall and/or Summer	60	45			15		Exam

Course content (Lecture)
Introduction: the structure of matter, forms of motion, fundamental interactions, methods and the structure of physics. Motion, forces and reference frames: discussion of Newton's principles of dynamics, equations of motion. Conservation of energy and conservation of momentum: kinetic energy, potential energy, collisions. Rotational motion: Steiner's law, Newton's laws. Gravitation: Kepler's laws. Basic relativity, time dilatation, length contraction, velocities, mass and energy. Electric current and magnetic field: Ohm's law. Maxwell's laws, oscillations, waves, wave equation, superposition principle. Optics: Snell law, reflection, lenses, interference, slit diffraction, coherence. Quantum phenomena and basis of quantum mechanics: de Broglie's waves, Schroedinger's equation. Atomic physics: Bohr' theory. Schroedinger' equation, quantum numbers, Pauli's principle, electronic configurations. Condensed matter: bonds in solids, phonons, energy bands, conductors, insulators and semiconductors, p-n junction. Nuclear physics: mass-spectroscopy, mass deficit and the binding energy, radioactive decays, nuclear reactions. Particles and cosmology: quark model, Hubble's law, Friedman's models, the Big-Bang theory, the relic radiation.

Course content (Laboratory)
Laboratory follows some of lecture course topics such as motion (pendulum, Steiner's law), electricity (electric current and magnetic field), waves (sound, microwaves, interference, diffraction pattern), geometrical optics (lenses, images), solid state physics (semiconductors, p-n junction, transistors).

References (Basic):
(basic and complete)lecturer's home page notes available on WWW page for students, with specific links to all notes needed for the course

References (Additional):
D Halliday and R Resnick, Physics, E.E.Anderson, Introduction to Modern Physics, R.W. Chabay and B.A.Sherwood, Matter and Interactions

Expected learning outcome:	Review of basic classical physics, elements of relativity and nuclear physics, better understanding of solid state physics and its application to understanding some key features of specific materials.
Language of instruction:	English

ERASMUS subject code:	13.2 (physics)
Prerequisites:	None
Assessment method:	Examination (written)
Unit:	Faculty of Physics and Applied Computer Sciene
Lecturer:	Prof. Andrzej Maksymowicz
Laboratory:	Dr Maciej Wołoszyn, Dr Bartłomiej Spisak
Modified:	January 2009