

Title <b>Basics of nanotechnology (Podstawy nanotechnologii)</b>	Code <b>1010401251010410709</b>
Field <b>TECHNICAL PHYSICS</b>	Year / Semester <b>3 / 5</b>
Specialty -	Course <b>core</b>
Hours Lectures: <b>2</b> Classes: -    Laboratory: <b>1</b> Projects / seminars: -	Number of credits <b>4</b>
	Language <b>polish</b>

**Lecturer:**

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**Status of the course in the study program:**

Core course of the study for Technical Physics, Faculty of Technical Physics.

**Assumptions and objectives of the course:**

Familiarize students with opportunities of technologies operating at the scale of nanometers, in particular: generic methodologies applied in nanoscience and nanotechnologies, specific properties of nanomaterials and their applications in science, industry and medicine.

**Contents of the course (course description):**

Properties of solid systems at the nanoscale: structural, mechanical, thermal, chemical, electronic, magnetic. Generic methods and techniques applied to nanoscale characterization: scanning tunneling microscopy, atomic force microscopy, electron microscopy, near-field microscopy. Molecular modeling and simulations. Nanostructure fabrication methods: "top-down" and "bottom-up". Basic types of nanostructures, their characteristics and applications: semiconductor nanostructures - including quantum wells, quantum wires, and quantum dots - nanomagnetic materials, carbon nanotubes, etc. Molecular nanotechnology and bionanotechnology.

**Introductory courses and the required pre-knowledge:**

Basic knowledge from a core course of physics, in particular: solid state physics, electromagnetism, optics, and fundamentals of quantum mechanics.

**Courses form and teaching methods:**

Lecture illustrated with presentations and computer simulations.  
Laboratories in a nanotechnology lab equipped with scanning probe microscopes and software for image processing.

**Form and terms of complete the course - requirements and assessment methods:**

Written and oral examination for the lecture.  
Tests and written reports for the laboratories. Semester grade is an average note of all laboratory grades.

**Basic Bibliography:**

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**Additional Bibliography:**

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