

**Course title:** Nanomaterials for optoelectronic and biological applications – selectable /  
regular course

**Number of contact hours:** 45 hours (45h lectures)

**ETCS credits:** 3

**Course description:** Expanding knowledge of students to comprehensive overview of synthesis and characterization of nanomaterials especially for optoelectronic and biological applications. Course modules will cover the fundamental scientific principles controlling assembly of nanostructured materials, novel synthesis methods and toxicity problem of nanomaterials; Expanding knowledge of students to understanding the design and properties of hierarchical nanostructures that are utilized in advanced applications, including photovoltaic applications, drug delivery, LEDs and others; The course will also provide the students with necessary background for understanding basic nanomaterials characterization techniques, including X-ray scattering diffraction, crystal structure analysis, microscopy techniques, dynamic light scattering and others.

**Education effects** (P6S\_UW, P7S\_WG):

Students are familiar with concepts of preparation and characterization techniques of nanomaterials for optoelectronic and biological applications.

Students have a clear view of the basic principles of nanotechnology and nanomaterials,

Students know in details the main synthesis methods of nanomaterials and the main tools for characterization

Students can apply knowledge of nanomaterials in various branches of industry (not-necessarily related directly to chemical industry) to solve technological and engineering problems associated with the area of own specialization

**Literature:**

[1] Vijaykumar B. Sutariya, Yashwant Pathak, „Biointeractions of Nanomaterials” 2015, Taylor & Francis Group

[2] Wei Chen, Shaowei Chen „Functional Nanometer-Sized Clusters of Transition Metals – synthesis, properties and applications”; 2013, Royal Society of Chemistry

[3] Ludovico Cademartiri, Geoffrey A. Ozin, „Nanochemia podstawowe koncepcje”  
Additional literature

Selected reviews and articles published in scientific journals

**Assessment method:** exam

**Prerequisites:** Basic knowledge in physics, chemistry and electrochemistry and biology  
Basic knowledge in analytical methods

**Primary target group:**

**Lecturer:** dr inż. Katarzyna Matras-Postolek - Cracow University of Technology