VILNIUS UNIVERSITY

CHEMISTRY OF NANOMATERIALS

Programme type	Master's studies (university)
Field of study	Chemistry
Study area	Physical Sciences
Qualification awarded	Master in Physical Sciences
Length of programme	2 years (4 semesters)
Scope of programme (ECTS)	120
Language of instruction	English
Location	Vilnius, Lithuania
Starting date	1st of September
Tuition fee EU students	3236 EUR/per year
Tuition fee Non-EU students	3250 EUR/ per year

PROGRAMME DESCRIPTION

Nanomaterials are an increasingly important product of nanotechnologies. They are coming into use in healthcare, electronics, cosmetics and other areas. Materials with structure at the nanoscale often have unique optical, electronic, or mechanical properties. Physical and chemical properties of nanomaterials often differ from those of bulk materials, so in this two-year Master's programme, students will gain in-depth knowledge on, and experimental experience with, novel nanomaterials and their synthesis, structure, and applications.

- *The objective*

Aims of this program Chemistry of Nanomaterials is to provide an education that gives students an introduction to the processes involved in scientific research; provides the knowledge and skills needed for a career as a professional chemist; apply theoretical knowledge to real chemical problems; provides a

suitable foundation for work in chemistry of nanomaterials or in a multi-disciplinary area involving chemistry and nanomaterials chemistry.

- *Career opportunities*

A graduate can be employed in chemical laboratories, research institutions or commercial structures dealing with high technologies.

- *Access to further studies*

Graduates of the Programme can choose doctoral studies in Chemistry or Biochemistry.

KEY LEARNING OUTCOMES

Graduates of the programme develop the main abilities:

- to perform scientific research and to solve problems, connected with synthesis, analysis and application of nanomaterials, to work in interdisciplinary areas;
- to choose and apply appropriate instrumental methods for investigation of conventional and nanomaterials, interpret and evaluate results of investigation;
- to identify and predict the ways of solution of a problem, to solve problems of unfamiliar character, to summarize and critically evaluate scientific information and its reliability, to understand the responsibility for the decisions taken.
- has developed critical and analytical thinking and information technology skills applicable in many contexts.

COURSE INFORMATION

The programme has the following structure

Course Type	1st Semester	2nd Semester	3rd Semester	4th Semester
Compulsory Courses	Nanomaterials and nanostructures: synthesis and description (10 ECTS)	Materials science and inorganic functional materials (8 ECTS)	Kinetical and Electrochemical Methods of Analysis (8 ECTS)	Final Master thesis (30 ECTS)
	Instrumental methods in nanotechnology (5 ECTS)	Master thesis (7 ECTS)	Master thesis (7 ECTS)	
	Organic Analysis in Materials Science (5 ECTS)			
	Master thesis (5 ECTS)			
Elective Courses	X-ray diffraction analysis (5 ECTS)	Biochemical and nanotechnological methods in bionanotechnologies (5 ECTS)	Chemistry and physics of f-elements (5 ECTS)	
	Gas chromatography (5 ECTS)	Electrochemical nanostructuring (5 ECTS)	Solid state reactions (5 ECTS)	

Course Type	1st Semester	2nd Semester	3rd Semester	4th Semester
		Self-Assembling and synthesis of nanostructural materials (5 ECTS)	Physics of molecular processes (5 ECTS)	
		Liquid chromatography (5 ECTS)	Electronic structure of inorganic materials (5 ECTS)	
		Solid state chemistry (5 ECTS)	Surface modification by polymer nanostructures (5 ECTS)	
			Organic functional materials (5 ECTS)	

GRADUATION REQUIREMENTS

Public defence of the Master Thesis.

ADMISSION REQUIREMENTS AND SELECTION CRITERIA

- Bachelor's degree or its equivalent in study areas such as Chemistry, Biochemistry, Material Science or Chemical Engineering;
- The competition score is composed of the grades in Analytical Chemistry, General Chemistry, Physical chemistry, Inorganic Chemistry, Organic Chemistry, Polymer Chemistry, Quantum Chemistry, Biochemistry, Chemistry of Colloids, Chemistry of Crystals and the Bachelor thesis paper;
- English language proficiency – the level not lower than B2 (following the Common European Framework of Reference for Languages (CEFR).

EXAMINATION AND ASSESSMENT REGULATIONS

The main form of evaluation is an examination. However, courses units may be evaluated by the pass/fail evaluation as well. Every course unit is concluded with either a written or written-oral examination or pass/fail evaluation. Final thesis is evaluated by defence committee.

Academic contact	Admission contact
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