



# UNIVERSITY OF NIŠ

**Course Unit Descriptor**

**Faculty**

Faculty of Mechanical Engineering

## GENERAL INFORMATION

Study program

**Mechatronics and Control**

Study Module (if applicable)

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Course title

Nanotribology

Level of study

Bachelor  Master's  Doctoral

Type of course

Obligatory  Elective

Semester

Autumn  Spring

Year of study

1

Number of ECTS allocated

6

Name of lecturer/lecturers

Jelena Ž. Manojlović

Teaching mode

Lectures  Group tutorials  Individual tutorials  
 Laboratory work  Project work  Seminar  
 Distance learning  Blended learning  Other

## PURPOSE AND OVERVIEW (max. 5 sentences)

This course aims to introduce the principles of nanotechnology, provide the theoretical and experimental fundamentals of nanoscience with the numerous nanotechnology applications in medicine or electronics, and many fields. Special attention is dedicated to nanotribology – an area of tribology which studies friction at the nanometer scale. The friction and lubrication phenomena and their causes are discussed at many levels, from macro to the level of atoms. Several experimental tools applied in nanotechnology research have been described, such as the Atomic Force Microscope and the Surface Forces Apparatus, and the results obtained by using them can demonstrate very specific physical behaviour change with scale. This course gives an overview of nanotechnology, the impact of nanotechnology on our future and their perspectives in many scientific fields.

## SYLLABUS (brief outline and summary of topics, max. 10 sentences)

1) Tribology, 2) nanotechnology, 3) nanotribology, 4) friction, lubrication and wear, 5) Studying the phenomenon of friction, wear and lubrication at the molecular level, 6) Instruments for research into the phenomena at the nanometer (AFM, XPS, SFA ...). 7) lubrication at the atomic level, 8) Self-assembled monolayers and their application, 9) microelectromechanical systems (MEMS) and nanoelectromechanical systems (NEMS).

**LANGUAGE OF INSTRUCTION**

- Serbian (complete course)       English (complete course)       Other \_\_\_\_\_ (complete course)
- Serbian with English mentoring       Serbian with other mentoring \_\_\_\_\_

**ASSESSMENT METHODS AND CRITERIA**

<b>Pre exam duties</b>	<b>Points</b>	<b>Final exam</b>	<b>points</b>
<b>Activity during lectures</b>	<b>10</b>	<b>Written examination</b>	<b>15</b>
<b>Practical teaching</b>		<b>Oral examination</b>	<b>25</b>
<b>Teaching colloquia</b>	<b>50</b>	<b>OVERALL SUM</b>	<b>100</b>

**\*Final examination mark is formed in accordance with the Institutional documents**