# DESCRIPTION OF THE COURSE

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| Name of the course:<br>**Micromechanics and Nanotribology** | Code: **MMTN 08.3** | Semester: 2 |
| Type of teaching:<br>Lectures, seminar and laboratory work | Lessons per week<br>L-2 hours, SW–1 hours<br>LW-2 hours | Number of credits<br>**5** |

## LECTURER:

Associated Prof. Ph. D. Mara Kandeva-Ivanova, MTF, tel.: 965 2643,
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Faculty of Industrial Technology, Technical University of Sofia

## COURSE STATUS IN THE CURRICULUM:

Eligible course for full-time students of the specialty „Mictotechnology and NanoEngineering" pursuing the educational and qualification degree "Master of Science"

## AIMS AND OBJECTIVES OF THE COURSE

The aim of the course "micromechanics and nanotribologiya" is to contribute to the deepening and broadening of knowledge in the field of micromechanical motion and characteristics, the nature and characteristics of the tribological processes-friction, wear, lubrication of macro-, micro-and nano-scale the direction of their effective use in the design, operation and development of microtechnology and MEMS.

## DESCRIPTION OF THE COURSE:

Considered free, forced, damping vibrations and strain-stress state of the bearing elements in micromechanical systems. Study the mechanisms, effects, characteristics and modeling of tribological processes - friction, wear and lubrication of macro, micro and nano- scale. Laboratory work related to the study of methods and techniques for measuring and testing of mechanical and tribological parameters in micromechanical systems

## PREREQUISITES:

mechanics, physics, mathematics, materials science, chemistry.

## TEACHING METHODS:

The lectures are conducted with the aim of samples. Laboratory exercises are performed with micro-mechanical equipment, macro, micro and nanotribological testers - UNMT with AFM (Ambios Technology), profilometer 3G, profilometer PRO500 3D, TABER ABRASER, electronic scales, Scanning electron microscope EVO MA10, optical microscope and others. Each student will develop an independent project.

## METHOD OF ASSESSMENT:

Written exam

**INSTRUCTION LANGUAGE:** Bulgarian

## BIBLIOGRAPHY:

1. V. Timofeev, Tehnicheskaya micro mechanics, Moscow, binomial, 2011.
2. Manolov N., M. Kandeva, General Tribology, "St. Ivan Rilski ", Sofia, 20041. Rassovska M.M.,
3.Bhushan, B., Sr. Sundararajian, *Micro/Nanotribology , Boca Raton:CRC Press LLC, 1999*
4.Rymuza Z., *Tribology of Miniature Systems*, ELSEVER, 1989
5.Jost, H.P., *The Presidential address*, World Tribology Congress 2009, Kyoto, Japan, 06-11.09.2009.