



МИНИСТЕРСТВО НА ОБРАЗОВАНИЕТО И НАУКАТА

Проект BG051PO001-3.1.07-0048 „Актуализиране на учебните планове и програми на специалностите във ФЕТТ, ФТК и МТФ на ТУ-София и създаване на нова съвместна магистърска специалност в съответствие с потребностите на пазара на труда“

DESCRIPTION OF THE COURSE

Name of the course: Metrology and mechanical tests of micro and nanosystems	Code: MMTN09.3	Semester: 2
Type of teaching: Lectures, seminars and laboratory work	Lessons per week L-1 hours, S-1, LW-2 hours	Number of credits 5

LECTURERS:

Assoc. prof. Vasil BogeV, Department of Precise techniques and apparatus, phone: 9653239, email: bogev@tu-sofia, prof. Ph. D. Todor Todorov, phone: 02/9652794, email: tst@tu-sofia.bg, Department of Theory of Mechanisms and machines.

COURSE STATUS IN THE CURRICULUM:

Metrology and mechanical tests of micro and nanosystems is optional course of Master course in "Microtechnology and nanoengineering",

AIMS AND OBJECTIVES OF THE COURSE

The aim of the course is learning and applying of methods and technical tools for measuring in the field of micro and nanotechnologies, and to model and test the operational functions and precision of measuring devices.

DESCRIPTION OF THE COURSE:

The main topic lectures include: Fundamentals of metrology and nanometrology, methods and tools for nanometrical measurements, unity of nanometric measurements and quantum metrology. Laboratory workshops embrace mechanical characteristic test of measuring devices for micro and nano objects, determination of metrological characteristics of data acquisition systems for micro and nanosystems, metric evaluation of micro accelerometers, investigation of thermo micro and nano effects, indirect and predictive methods for investigation of micro and nanosystems. The tutorials involve metric chains in micro and nanosystems, determining the influence of geometry and mutual position errors and scaling factor method of measurement.

PREREQUISITES: Knowledge of Physics, Engineering metrology Signal Theory and Sensors are required.

TEACHING METHODS: Lectures are held using by visual and virtual technique.

Laboratory exercises are conducted through modern laboratory evaluation setups.

METHOD OF ASSESSMENT: Exam at the end of the second semester. The final grade is calculated as sum of 70% of exam grade and 30% of laboratory mark.

INSTRUCTION LANGUAGE: Bulgarian.

BIBLIOGRAPHY: 1.Radev H.,(editor), Metrology and measurement techniques. Vol. 3. Softreid, 2012.

2. Dixler K. E, Engines of creation 2.0. The coming era of nanotechnology, Doubleday, 20th anniversary edition. 2007.

3. Jackson M. J., Micro and nanomanufacturing, Springer Science+Business Media, LLC, 2007.

4. Benjamin Fry K. K., Nanotechnology-Enabled Sensors, Springer Science+Business Media, LLC, 2008.