



Европейски съюз

ОПЕРАТИВНА ПРОГРАМА  
„РАЗВИТИЕ НА ЧОВЕШКИТЕ РЕСУРСИ“ 2007-2013

Европейски социален фонд

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: <b>Surface nanochemistry</b>	Code: <b>MMTN08.2</b>	Semester: 2
Type of teaching: Lectures, laboratory works and tutorials	Lessons per week L-1 hour, LW-2 hours T-1hour	Number of credits: <b>5</b>

**LECTURER:**

Assoc. Prof. Ph.D. Boriana Rangelova Tzaneva, e-mail: borianatz@tu-sofia.bg,  
 Assist. Prof. Ph.D. Mladenka Hristova Loukaycheva, e-mail: loukaycheva@tu-sofia.bg,  
 Technical University of Sofia, Faculty of Electronic Engineering and Technologies,  
 Department of Chemistry, phone: 9653663

**COURSE STATUS IN THE CURRICULUM:**

Optional for the students specialty "Microtechnology and nanoengineering" MEng programme of the Faculty of Electronic Engineering and Technologies.

**AIMS AND OBJECTIVES OF THE COURSE:**

The objective of the course "Surface nanochemistry" is that students receive knowledge of the general processes and phenomenon taking place on different surfaces and phase interfaces. During the laboratory works students acquire skills to characterize there parameters. The gain knowledge and abilities will allow the students to solve important practical tasks in the field of material science.

**DESCRIPTION OF THE COURSE:**

Concepts as surface tension, wetting, capillarity, adsorption and orientation of interface are introduced. The thermodynamic criterions for spontaneous or forced occurrence of chemical reactions during monomolecular and thin layers formation as well as some of the electrokinetic phenomenon as electrophoresis, electroosmosis and electrocapillarity connected with interface surface charge are discussed. Special attention is paid of processes of nucleation, growth and agglutination of clusters leading to different nanostructures formation. All processes and phenomenon discussed above are in the base of self structuring in nanolevel, nanomatrix and nanopatterns formation.

**PREREQUISITES:**

Physics, Chemistry, Materials science, Nanomaterials

**TEACHING METHODS:**

Lectures delivered by using visual aids. Laboratory works are carried under instructions of assistant professor according "laboratory work guide", students prepare reports. Optional choose and elaboration of course project. Tutorials are dedicated to preliminary theoretical preparation for laboratory works and deepening in material from lectures.

**METHOD OF ASSESSMENT:**

Current assessment during laboratory works and tutorials (40 %) and written examination (2 hours) in the end of 2<sup>th</sup> semester (60 %).

**INSTRUCTION LANGUAGE:** Bulgarian (English is also possible)

**BIBLIOGRAPHY:**

1. H.Y. Erbil, Surface Chemistry of Solid and Liquid Interfaces, Blackwell Publishing, ISBN-10: 1-4051-1968-3, 2006
2. D. J. Shaw, Introduction to Colloidal and Surface Chemistry, Elsevier Science, 2003.
3. A.W. Adamson, Physical Chemistry of Surfaces, Wiley, ISBN 0-471-14873-3, 1997.