

Information sheet for the course Materials Science

University: <i>Alexander Dubček University of Trenčín</i>	
Faculty: <i>Faculty of Industrial Technologies in Púchov</i>	
Course unit code: <i>M-P-1</i>	Course unit title: <i>Materials Science</i>
Type of course unit: <i>compulsory</i>	
Planned types, learning activities and teaching methods: <i>Lecture: 2 hours weekly/26 hours per semester of study; face to face</i> <i>Seminar: 2 hours weekly/26 hours per semester of study; face to face</i> <i>Laboratory tutorial: 0</i>	
Number of credits: <i>4</i>	
Recommended semester: <i>1st semester in the 1st year full-time</i> <i>1st semester in the 1st year part-time</i>	
Degree of study: <i>the 3rd degree of study (PhD. degree)</i>	
Course prerequisites: <i>none</i>	
Assesment methods: <i>Students of the doctoral study programe will individually work on a project focused on the detailed analysis and characteristic properties of materials which will be a part of the research of their disseration. In the project the students will base their investigations on the present state of the issue, on data from literature and foreign scientific publications. Each doctoral student will present his project in the form of a ppt presentation to his lecturer and schoolmates and will answer questions in a debate. After attending all lectures and consultations on the subject, executed in form of a discussion between the lecturer and students, the doctoral study graduant will work out a written report focused on the characteristics of the particular material investigated in his/her dissertation, and the fundamentals of the method used in the study of the given material. The minimum requirement for obtaining credits is the successful defendance of the project and gaining at least 60% points for the written report.</i>	
Learning outcomes of the course unit: <i>Students will extend their knowledge in materials engineering, which they will apply to industrially significant materials. They will gain broad knowledge of the effect of the chemical composition of a material on the comprehensive properties of the material which they investigate in their dissertations and will find the relations between significant and immaterial variable parameters of the given research. The students will perfectly understand the principles of methods of the study of important material characteristics. They will be able to analyze and evaluate independently the investigated issue, to predict on the basis of the obtained properties of the investigated material, its function in operating conditions. On the basis of the obtained properties of the investigated material they will be able to design new types of materials for particular structures or structural elements.</i>	
Course contents: <i>Brief characteristics of structural materials from the aspect of material and utility properties</i> <i>Conditions for the life of materials in given structures</i> <i>Statical and dynamic loading of materials</i> <i>Effect of the environment (external conditions) on material properties</i> <i>Limit states of materials used for components</i>	

Characteristics of materials with respect to their production (casting, welded material, material obtained by plastic straining, machined material, etc)
Effect of plastic strain on the structure of material
Definition of imperfections in materials and their identification
Proposals of surface treatment (coating, heat treatment, etc.)
Fracture behaviour of materials under various loads. Fractography
Mechanical properties of materials
Physical properties of materials
Chemical properties of materials
Structural properties of metallic and nonmetallic materials
Nonmetallic materials and their material characteristics
Advanced types of materials (materials for power engineering, biomaterials, transportation and mechanical engineering)
Composites and nanocomposites.

Recommended references and resources:

1. *Zborníky z vedeckých konferencií. Informácie z internetu www stránok.*
2. *Puškár,A.,Hazlinger,M.:Porušovanie a lomy súčastí. EDIS Žilina, 2000, ISBN 80-7100-654-8.*
3. *Hazlinger, M.,Moravčík, R.: Degradáčné procesy a predikcia životnosti, AlumniPress, 2007, ISBN 978-80-8096-031-5.*
4. *Ptáček,L. a kol.: Nauka o materiálu I,II,III, Brno, CERM, 20001, ISBN 80-7204-193-2*

Language: *Slovak*

Remarks: *none*

Evaluation history: *Total number of classified students : 0*

A	B	C	D	E	FX
0.0	0.0	0.0	0.0	0.0	0.0

Lecturers: *prof. Ing. Františka Pešlová, PhD., doc. Ing. Pavol Lizák, PhD.*

Last modification: *30.04.2014*

Supervisor: *prof. Ing. Darina Ondrušová, PhD.*