Information sheet for the course
Utility Properties and Materials Design

University: *Alexander Dubček University of Trenčín*

Faculty: *Faculty of Industrial Technologies in Púchov*

Course unit code: *MT-P-26* | **Course unit title:** *Utility Properties and Materials Design*

Type of course unit: *compulsory*

Planned types, learning activities and teaching methods:
Lecture: 2 hours weekly/26 hours per semester of study; face to face
Seminar: 2 hours weekly/26 hours per semester of study; face to face

Number of credits: *4*

Recommended semester: *4th semester in the 2nd year full-time*
6th semester in the 3rd year part-time

Degree of study: *the 1st degree of study (Bachelor's degree)*

Course prerequisites: *MT-P-4 Material Science I, MT-P-10 Materials processing technology I.*

Assessment methods:
This subject briefly introduces the concepts of failure analysis, root-cause analysis, and the role of failure analysis as a general engineering tool for enhancing product quality and failure prevention. The major steps of students will be to describe the current situation, analyze the problem to identify the causes, develop corrective actions and validate and verify corrective actions.
Three written solutions of students will be assessed by maximal points at 5 as following:
A – from 14 to 15 points,
B – from 12 to 13 points,
C – from 10 to 11 points,
D – from 8 to 9 points,
E – from 6 to 7 points.

Learning outcomes of the course unit:
Student has systematic and complex knowledges about utility properties of different materials, knows rules of materials design, can propose solutions to prevent possible failures. Student can explain the main reason of material choice and economic aspects.

Course contents:
1. *The main causes of structure failures.*
2. *Material selection and technology*
3. *Reasons of unappropriate choice*
4. *Manufacturing aspects of design*
5. *Design tools*
6. *Ashby diagrams*
7. *Risk*
8. *Economic aspects*

Recommended of required reading:

1. *Askeland, D.R.- Phulé, P.P.: The Science and Engineering of Materials. Thomson-Brooks/Cool, 4th ed. 2003 (5th ed. 2005)*
2. *Callister, W.D., Jr.: Materials Science and Engineering. An Introduction. John Wiley & Sons, Inc., 6th ed., 2003*
3. *ASM Handbook Vol 20 – MATERIALS SELECTION (ASM Publ. 1997)*
4. *Materials Selection in Mechanical Design, Michael F.Ashby; Pergamon Press 1992*

Language: *Slovak*

Remarks:

Evaluation history:					
A	B	C	D	E	FX
Lecturers: *doc. Ing. Marta Kianicová, PhD.*					
Last modification: *31.03.2014*					
Supervisor: *doc. Ing. Marta Kianicová, PhD.*					