

## Information sheet for the course: Microscopic Methods of Structure Evaluation

<b>University:</b> Alexander Dubček University of Trenčín	
<b>Faculty:</b> Faculty of Industrial Technologies in Púchov	
<b>Course unit code:</b> MI-I-P-13	<b>Course unit title:</b> Microscopic Methods of Structure Evaluation
<b>Form, scope and method of educational activity:</b> <b>Form of study:</b> Lecture / Seminar / Laboratory tutorial <b>Recommended number of lessons (hours):</b> <b>Weekly:</b> 1 / 1 / 2 <b>During the semester:</b> 12 / 12 / 24 <b>Method of study:</b> attendance method	
<b>Number of credits:</b> 4	
<b>Recommended semester:</b> 3.	
<b>Degree of study:</b> The 2nd degree of study	
<b>Course prerequisites:</b>	
<b>Assessment methods:</b> Assessment during the semester: Summary assessment of work results during the semester = 40 points Semester work - project and independent work during the semester. The project is focused on the use of the scanning electron microscopy method in the evaluation of material structures. A student who obtains at least 20 points in the interim evaluation can apply for the exam.  Final assessment: Assessment of exam results = 60 points  Grading scale: Grade A: 91 – 100 points Grade B: 81 – 90 points Grade C: 71 – 80 points Grade D: 61 – 70 points Grade E: 55 – 60 points Grade FX: less than 55 points	
<b>Learning outcomes of the course unit:</b> The student is oriented in the method of scanning electron microscopy and energy-dispersive spectroscopy. It handles advanced preparation of conductive and non-conductive samples. The student can interpret structural characteristics from images using SEM detectors. He knows how to work in detail with data obtained by the method of energy-dispersive spectroscopy. The student is able to comprehensively evaluate the structures of conductive and non-conductive materials depending on knowledge from the method of scanning electron microscopy and the method of energy-dispersive spectroscopy.	
<b>Course contents:</b> Advanced knowledge of the method of scanning electron microscopy and the method of energy-dispersive spectroscopy and their comparison with other methods for the evaluation of structures that are used in industrial practice and in the scientific field. The issue of sample preparation for scanning electron microscopy and energy-dispersive spectroscopy in terms of optimal signal from the analyzed areas. Evaluation of the microrelief of the analyzed areas in the mode of secondary electrons. Evaluation of material contrast in the mode of backscattered electrons. Analysis of the chemical composition of technically usable materials by the EDS method with advanced types of analyses. Evaluation of structures of conductive materials. Evaluation of the structures of non-conductive materials.	
<b>Recommended of required reading:</b> MARTINKOVIČ, M., RÍZEKOVÁ - TRNKOVÁ L.: Náuka o materiáloch I - NÁVODY NA CVIČENIA. Trnava: AlumniPress, 183s., 2009. Edičné číslo: 19/AP/2008, ISBN	

978-80-8096-079-7, EAN 9788080960797, zverejnené na <https://is.stuba.sk>  
MORAVČÍK, R., HAZLINGER, M., HUDÁKOVÁ, M., MARTINKOVIČ, M., ČIČKA, R.:  
Náuka o materiáloch I. Trnava: AlumniPress, 249s., 2010. Edičné číslo: 8/AP/2009, ISBN  
978-80-8096-123-7, EAN 9788080961237, zverejnené na <https://is.stuba.sk>  
KONEČNÁ, R., FINTOVÁ, S.: Praktická metalografia, 2010. [http://kmi2.uniza.sk/wp-content/uploads/2010/10/Prakticka\\_Metalografia.pdf](http://kmi2.uniza.sk/wp-content/uploads/2010/10/Prakticka_Metalografia.pdf)  
MORAVČÍK, R., HAZLINGER, M.: Náuka o materiáli II. Trnava: AlumniPress. 243 s.,  
2009. Edičné číslo: 1/AP/2009, ISBN 978-80-8096-081-0, EAN 9788080960810,  
<https://is.stuba.sk>  
HÍREŠ, O.: Fyzikálna metalurgia ocelí a ich tepelné spracovanie. Vysokoškolská učebnica,  
Trenčín: Trenčianska univerzita AD v Trenčíne, 169s., 2006. ISBN 80-8075-099-8, EAN  
9788080750998.  
ORAVEC, K.: Vybrané kapitoly z tepelného spracovania kovov. Košice: Vydavateľstvo: C -  
PRESS, 2005. ISBN 80-8073-248-5.  
ZÁBAVNÍK, V., BURŠÁK, M.: Materiál, Tepelné spracovanie, Kontrola kvality. Košice:  
Vydalo: Tlač - Emilena, Košice, 279s., 2004. ISBN 80-8073-159-4, EAN 9788080731565.  
E-learning TnUAD.

**Language:**

English

**Remarks:**

Compulsory course

**Evaluation history: 0**

Total number of graded students:

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

**Lecturers:** Ing. Mariana Janeková, PhD., Ing. Andrej Dubec, PhD.,**Last modification:** 31.08.2022**Supervisor:** prof. RNDr. Mariana Pajtášová, PhD.