

Structure of Materials		
Faculty:	Faculty of Geosciences	
Name of study program:	<b>Materials and Metallurgy</b>	
Department:	<b>Materials and Metallurgy</b>	
Level:	Master	
The code of subject:	2	
Subject:	<b>Structural and microstructural analysis I</b>	
Subject Status:	Compulsory /Winter	(Winter / Summer)
Semester:	II	(According to approved programe)
Total hours:	3+2	(According to approved programe)
ECTS:	7	(According to approved programe)
Schedule / Hall		
Academic year:		
Professor:		
Assistants:	Lecturer:Muharrem Zabeli	Assistant
Email:	Muharrem.zabeli@umib.net	
Telefon:	+38328535725	
Course description:	The course includes modern methods of studying the microstructure of materials, selection, application and explanation of the obtained data. The main methods that are examined in this course are: electron microscopy, belonging to SEM and TEM. The lectures are supported with concrete examples of the microstructure of different material	
Course objectives:	<i>The purpose of this course is to familiarize students with the basic principles of instrumental methods; Operating principle of the devices-instruments-modern equipment, as well as their use in quantitative and qualitative analysis.</i>	
Learning outcomes:	After successful completion of this course, the student should be able to: <ol style="list-style-type: none"> <li>1. Analyze the main techniques for microstructure analysis.</li> <li>2. Describe the characteristics of X-rays.</li> <li>3. Identify the effects of radiation on human health and the steps of radiation protection.</li> <li>4. Evaluate the basics of elementary and phase analysis</li> <li>5. Describe the different techniques for X-ray production and detection.</li> </ol>	
Designed study plan:	Week	Lectures which will be held
	First week:	Atomic Structure and Interatomic Bonding in Solids
	Second week:	2. The Structure of Crystalline Solids and Noncrystalline Materials
	Third week:	3. Imperfections in Solids
	Fourth week:	4. Diffusion
	Fifth week:	5. Mechanical Properties of Metals
	Sixth week:	6. Dislocations and Strengthening Mechanisms in Metals 7
	Seventh week:	. Failure, (Fatigue, and Creep)
	Eighth week:	8. Phase Diagrams
	Ninth week:	9. Phase Transformations
	Tenth week:	10. Applications and Processing of Metal Alloys
	Eleventh week:	11. Structures and Properties of Ceramics, Applications and Processing of Ceramics

		Twelfth week:	12. Polymer Structures																																																						
		Thirteenth week:	13. Composites																																																						
		Fourteenth week:	14. Corrosion and Degradation of Materials																																																						
		Fifteenth week:	15. Electrical Properties																																																						
Literature	Basic	1. Brandon David & Kaplan D Wayne. "Microstructural Characterization of Materials" 2nd Edition, Technion, Israel Institute of Technology, © 2008, Israel 2. Yoshio Waseda & Kozo Shinoda & Eiichiro Matsubara, "X-Ray Diffraction Crystallography Introduction, Examples and Solved Problems", © Springer-Verlag Berlin Heidelberg 2011 . Mursel Rama "Përmbledhje e ligjëratave" FXM, Mitrovice 2008																																																							
	Additional	1. C. Richard Brundle, Charles A. Evans, Jr. & Sbaun Wihon, "Encyclopedia of Mlaterials Characterization-Surfaces, Interfaces, Thin Films", Copyright by Butxetworch-Heinemann, division of Reed Publishing CUSA) Inc 2. Tonejc A. "Metode pripreme i karakterizacije materijala", Skripta 2010, Zagreb 3. Adam J. Schwarz, Mukul Kumar & Brent L. Adams, "Electron Backscatter Diffraction in Materials science", New York, ISBN 0-306-46487-X, © 2000 4. MATTER – CD																																																							
Teaching methods		Interactive lectures, numerical and exercises. Tests during lectures																																																							
Contribution on student load	<table><tr><th>Activity</th><th>Hours</th><th>Days/week</th><th>Total</th></tr><tr><td>Lectures</td><td>3</td><td>15</td><td>45</td></tr><tr><td>Exercise theoretical/laboratory</td><td>2</td><td>15</td><td>30</td></tr><tr><td>Practice work</td><td></td><td></td><td></td></tr><tr><td>Contact with lecturer/consultations</td><td>2</td><td></td><td>2</td></tr><tr><td>Field exercises</td><td>-</td><td>-</td><td>-</td></tr><tr><td>Mid-terms, seminars</td><td>2</td><td>2</td><td>4</td></tr><tr><td>Homework</td><td>2</td><td>3</td><td>6</td></tr><tr><td>Individual time spent studying (at the library or home)</td><td>5</td><td>15</td><td>75</td></tr><tr><td>Final preparation for the exam</td><td>7</td><td>1</td><td>7</td></tr><tr><td>Time spent in evaluation (tests, quiz, final exam)</td><td>2</td><td>3</td><td>6</td></tr><tr><td>Projects, presentations, etc.</td><td>1</td><td>1</td><td>1</td></tr><tr><td>Total</td><td></td><td></td><td>176</td></tr></table>					Activity	Hours	Days/week	Total	Lectures	3	15	45	Exercise theoretical/laboratory	2	15	30	Practice work				Contact with lecturer/consultations	2		2	Field exercises	-	-	-	Mid-terms, seminars	2	2	4	Homework	2	3	6	Individual time spent studying (at the library or home)	5	15	75	Final preparation for the exam	7	1	7	Time spent in evaluation (tests, quiz, final exam)	2	3	6	Projects, presentations, etc.	1	1	1	Total			176
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Evaluation methods		Tests / Colloquia			2x15 (%)																																																				
		Practical test during exercises			10 (%)																																																				
		Seminar paper			10 (%)																																																				
		Homework during the semester			10 (%)																																																				
		Final exam 40 (%)			40 (%)																																																				
Academic policies and rules of conduct:		Regular attendance is required of students in lectures and exercises. Rules of conduct as quieting learning, access to the hall of learning time, turn off cell phones, etc. are also mandatory.																																																							

