Course Outline Model (Syllabus)		
Faculty	Geoscience	
Department:	MATERIALS AND METALLURGY	
Level:	Master	
The code of subject:	5	
Subject:	**Functional Materials**	
Subject status:	Elective	(Compulsory or elective)
Semester:	III	(Winter/ Summer)
Total hours:	2 + 2	(According to approved program)
ECTS:	4	(According to approved program)
Schedule/Hall		
Academic year:		
Professor:	Muharrem Zabeli	
Assistant:		
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BRIEF CONTENT OF SUBJECT	Key concepts related to electrical conductive materials (pure Cu, Cu alloy, aluminum conductive material). Electrotechnical bases, and notions in the technique of contact materials. Properties of contact materials. Composite composite contacts with layers. Carbon contact materials. Resistant materials. Conductive materials for heating. Resistor. Technique of thick, thin and hybrid layers. Insulating materials, properties, classification and application. Solid insulating materials. Organic insulating materials / inorganic insulating materials / liquid insulating materials. Insulating gaseous materials. Semiconductors, superconductors, spongy metal materials. Materials for batteries, metallic glass, nanomaterials, hybrid materials and other special materials.	
AIMS	During the lectures and exercises we will focus on the acquisition of scientific knowledge from the field of energy resources and its consumption for the production and processing of special materials, such as; materials for electrical conductors, contact materials, resistive materials, insulating materials, foam metal materials, battery materials and other materials with special properties.	
EXPECTED LEARNING OUTCOMES	. During this study module, the student will achieve; 1. get acquainted with hybrid techniques; 2. describe the properties of insulating materials, their classification and requirements for insulating materials; 3. define the concepts of nanotechnology and nanomaterials; 4. define the properties, methods and techniques for obtaining special materials; 5. analyze the possibilities and advantages of applying materials for work at high and low temperatures; 6. conceive the distinguishing characteristics of materials.	
PROGRAM	**Weeks**	Topic and Readings
	Week - I	Electrically conductive materials (electrotechnical bases - copper conductive material, pure copper, copper alloys);

	Week - II	Electrically conductive materials (aluminum conductive material, pure aluminum, aluminum alloys);
	Week - III	Contact materials (classification of contacts, notions in the material of contact materials, properties of contact materials);
	Week - IV	Contact materials (layered composite contacts, carbon contact materials);
	Week - V	Resistant materials, (electrotechnical bases, conductive materials for heating, resistors);
	Week - VI	Resistant materials (thick layer technique, thin layer technique, hybrid technique); Case study - topic definition;
		Exam- I
	Week - VII	Resistant materials, (thick layer technique, thin layer technique, hybrid technique);
	Week - VIII	Insulating materials (classification and requirements of insulating materials, electrical properties and their measurement);
	Week - IX	Insulating materials (important non-electrical properties, solid insulating materials, organic insulating materials);
	Week - X	Insulating materials (inorganic insulating materials, liquid insulating materials, gaseous insulating materials);
	Week - XI	Metal and ceramic superconductors;
	Week - XII	Foam metallic materials;
	Week - XIII	Battery materials; Case study defense.
	Week - XIV	Synthesized materials;
	Week - *XV*	Perspective of specific materials.
		Exam -II

LITERATURE	Basic literature: 1. MilajeteShala-Mehmeti, HamitMehmeti, Materialet eveçanta II, Prishtine, 2009; 2. T.-R. Hsu, MEMS and Microsystems: Design, Manufacture, and Nanoscale Engineering, John Wiley & Sons, 2008; 3. Milton Ohring, Enginering Materials Science, Hoboken, London, 1995 Supplementary literature: 1. Mehmeti H., Oettel H., Mehmeti-Shala, "Shkenca e Materilave" UP, Prishtine, Freiberg, 2000; 2. William F. Smith, Javad Hashemi, Foundations of Materials Science and Engineering, 4th ed., 2006, McGraw-Hill. 3. Serope Kalpakjian, Steven R. Schmid, Manufacturing Processes for Engineering Materials, 5th ed., 2006, by Pearson Education. 4. Callister W. D., "Material Science and Engineering and Introduction" Third Edition John Wiley & Sons, INC 1994;
TEACHING METHODOLOGY	Lectures, discussions, case studies, presentations by students, practical work, assignments, preparation of reports from study visits, and group work of students.

Contribution to student workload (which should correspond to student learning outcomes 1 ECTS credit = 25 hours)

Acitivity	hour	Days/Weeks	Totally
Lectures	2	15	30
Exercise sessions – theoretical/laboratory	2	15	30
Field exercises	4		4
Practical work	4	2	8
Consultations with the professor / assistant	4		4
Colloquiums / seminars	2	2	4
Independent tasks (work)	2	3	6
Student self study time (in library or at home)	2	11	22
Final exam preparation	10	1	10
Time spent in assessment (tests, quizzes, final exams)	1	3	3
Projects, presentations, etc.	2	2	4
Total			**125**

EVALUATION

Evaluation methods [according to the Statute and Regulation of UMIB Studies]	
Test- I	25 %
Compilation of reports from the study visit	10 %
Assignments and courses during the semester	20 %
Interpretation and presentation of seminary work	20 %
Test- II	25 %
Final exam	40 % (students who have not succeeded in intermediate tests)

ACADEMIC POLICIES

The criteria for regular attendance and the rules of etiquette are set during the organization of the lesson. **Students who have not participated in more than seven lectures, will not be able to be subject to any of the evaluation criteria.**

Further instructions:

• Computer work

Written works must be computer written. In the works it is obligatory to respect the criteria for both the visual and the content aspect of the required works. During the works it is required to respect the spelling rules and APA style

• Ethics in teaching

The different semester papers should be papers of each student. There will be no tolerance for copying, "borrowing" from the Internet or any other material. The same or similar works will have negative evaluations in the final evaluation of the student.

• Deadlines

In agreement with the students, the deadlines for submitting works will be determined. There will be no tolerance for delays in the submission of works. Failure to arrive at the time when the assignment is explained does not justify the student for not submitting the paper. The deadline will be given earlier. If you are going to travel abroad, then you need to submit the paperwork in advance. The student has the right to request a consultation with the professor whenever he / she deems it reasonable and necessary for the performance of his / her work.

• Rules of conduct and academic policies:

o active participation of students in lectures
o participation in discussion, comments and free expression of opinion, opinion and academic position (with arguments)
o Mandatory independent work and use of additional sources of information (various scientific websites, scientific journals, conference proceedings, etc.)
o Respecting lecture schedules without compromising academic freedom (silent cell phones)
o respecting the word, thoughts and ideas of colleagues
o low tolerance for late arrivals and departures without any valid reason
o preparation and equipping with relevant lectures (obligation of the teacher).