

EXTRACTIVE METALLURGY LABORATORIES Code Semester Local Credits ECTS Credits Tutorial Laboratory MET 3364E 6 1 3 - 2 Department/Program Metallurgical and Materials Engineering Department Course Language Engineering Department Course Operand Required Engineering Science Engineering Department General Education Course Description Basic Engineering Course Cooper concentrates. Commetation hydroxide precipitation and analysis techniques, Reduction electrolysis of cooper. Cooper productor via sulphatizing roasting of sulfrous cooper concentrates. Commetation, production of inco cre powders, Reduction of terrous raw materials and optica investigations. Process automation and control. Course Objectives Comprehensive understanding of the theoretical subjects covered in extractive metaling participar and towick as teams. Course Learning 0 Comprehensive understanding of the theoretical subjects covered in extractive metaling via diffective suppling the engineering knowledge gained in classes to design and conduct lab-scale experiments, to analyze their results. and to write as teams. Course Learning 0 Comprehensive understanding of the theoretical subjects covered in extractive metaling via discustanding of the theoretical subjects covered in extractive metaling via discustanding of the toreation subjects between the parameters, and will be able to analyze the results of	Course Name								
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COURSE PLAN

		Course
Weeks	Topics	Outcomes
1	Registration	1
2	Introduction to metallurgical laboratories and labratory security	1
3	Cupellation	1-5
4	Refining and reduction electrolysis of copper	1-5
5	Copper production via sulphatizing roasting of sulfurous copper concentrates	1-5
6	Cementation, hydroxide precipitation and analysis techniques	1-5
7	Reduction electrolysis of zinc	1-5
8	Carbothermal reductive melting	1-5
9	Metallothermal reductive melting	1-5
10	Pelletizing of iron ore powders	1-5
11	Reduction of ferrous raw materials and optical investigations	1-5
12	Make-up experiments	1-5
13	Make-up experiments	
14	Make-up experiments	

Relationship between the Course and Metallurgical & Materials Engineering Curriculum

	Program Outcomes			Level of Contribution		
		1	2	3		
1	Ability to apply the knowledge of mathematics, science and engineering principles to solve problems in metallurgical and materials engineering (ABET:a)	х				
2	Ability to characterize materials using standard and/or self designed experimental methods and to evaluate the results (ABET:b)			х		
3	Ability to design a system or a process, taking into consideration of the desired specifications, quality, ethics and environment. (ABET:c)					
4	Ability to communicate both orally and in the written form and to take part in, and provide leadership of the teams in the elucidation of engineering problems; (ABET:d, g)			х		
5	Ability to define, formulate and solve engineering problems in the development, production, processing, protection and usage of engineering materials. (ABET:e)			х		
6	An understanding of professional and ethical responsibilities(ABET:f)	Х				
7	An understanding of current/contemporary issues and impact of engineering solutions in broad cultural, national and global levels;. (ABET:h, j)					
8	A comprehension of the nature of engineering progress closely linked with the development of new materials and production processes. An ability to engage in life-long learning and a recognition of its necessity (ABET:i)	x				
9	Ability to use essential tools and techniques of modern engineering in the development, production, processing, protecting of the existing and new engineering materials. (ABET:k)	Х				

1: Little, 2. Partial, 3. Full

Course relationships with major elements of the field and material classes

			Level of	
		Contribution		ion
		1	2	3
MAJOR ELEMENT OF THE FIELDS	STRUCTURE			х
	PROPERTIES			Х
	DESIGN EXPERIMENT/ANALYSE DATA			Х
	PROCESSING		Х	
	COST/PERFORMANCE	X		
	QUALITY/ENVIRONMENT			Х
	DESIGN PROCESS OR PRODUCT			х
	METAL			Х
	CERAMICS			x
WATERIAL CLASSES	POLYMERS			
	COMPOSITES			

1: Little, 2. Partial, 3. Full

Prepared by	Date	Signature
All Faculty Members	December 2020	