

1. Course Description

COURSE DESCRIPTION FORM	
Course Code and Title	CHE480 BORON TECHNOLOGY
Course Semester	8
Catalog Description (Content) of the Course	Boron and its compounds, sprouts, reserves. Ore enrichment. Manufacture of refined boron products. Advanced boron end products. Boron usage areas.
Main Textbook	Borates, Handbook of Deposits, Processing, Properties and Use, D.E. Garrett, Academic Press, 1998. •
Supporting Textbooks	İnorganik Teknolojiler-1, H. Civelekoğlu, R. Tolun ve N. Bulutçu, İTÜ Yayınları, 1987. • The Economy of Boron, Roskill Information Services Ltd., 10. Baskı, 2002. • Metin Gürü, Çetin Çakanyıldırım “Boron Hydrides, High Potential Hydrogen Storage Materials”, Chap.4 : Hydrogen cycle with sodium borohydride, ISBN: 978-1-61668--362-7, 2010.
Course Credit (ECTS)	4
Prerequisites of the Course (Compulsory attendance should be indicated here.)	No
Type of the Course	Elective
Instruction Language of the Course	English
Object and Target of the Course	To teach production of boron minerals, boron concentrates, refined boron products and advanced boron products and usage areas of boron products.
Learning Outcomes of the Course	Recognition of boron products and understanding, development of boron technology.
Mode of Delivery	Face to face education
Weekly Schedule of the Course	COURSE CONTENT 1. week Physical and chemical properties of boron. 2. week Boron sprouts and boron reserves in the world and in Turkey. 3. week Boron compounds in the world and in Turkey. 4. week Production of refined boron products 5. week Sodium perborate, anhydrous borax, boron oxide. 6. week Sodium perborate, anhydrous borax, boron oxide. 7. week Boron carbide, boron nitride 8. week Metal boron hydrides 9. week Boron usage areas, cement, ceramic industry, glass industry,

	10. week	Boron usage areas, detergent industry, agriculture, metallurgy industry.				
	11. week	Boron usage areas, paper sector, flame retardants, nuclear applications				
	12. week	Boron usage areas, ceramic industry, glass industry, detergent industry, agriculture, metallurgy industry. paper sector, flame retardants, health				
	13. week	Boron usage areas, energy and nuclear applications				
	14. week	Boron usage areas, energy and nuclear applications				
Educative Activities <i>(Credit will be determined based on the time given for these activities. Should be filled carefully.)</i>	Theoretical Study Hours of Course Per Week Reading Searching in Internet and Library Preparing Reports Preparing Presentation Presentation Mid-Term and Studying for Mid-Term Final and Studying for Final					
Assessment Criteria			Quantity	Total Contribution (%)		
		Midterm	2	40		
		Homework				
		Assignment				
		Projects	1	20		
		Practice				
		Quiz				
		Contribution of In-term Studies to Overall Grade		60		
		Contribution of Final Examination to Overall Grade		40		
		Attendance				
Workload of the Course			Activity	Total Week Count	Weekly Duration (in hour)	Total Workload in Semester
			Theoretical Study Hours of Course Per Week	14	3	42
			Practicing Hours of Course Per Week			
			Reading	8	2	16
			Searching in Internet and Library	8	2	16
			Designing and Applying Materials			
			Preparing Reports	3	3	9
			Preparing Presentation	1	3	3
			Presentation	1	1	1
			Preparing Homework			
			Mid-Term and Studying for Mid-Term	2	4	8

		Final and Studying for Final	1	5	5		
		Other					
		Total work load			100		
		Total work load/25			4.0		
		ECTS of the course			4		
Course's Contribution To Program	Number	Program Outcomes	1	2	3	4	5
	1	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline; ability to use theoretical and applied information in these areas to model and solve engineering problems.	x				
	2	Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.	x				
	3	Ability to design a complex system, process, device or product under realistic constraints and conditions, in such a way as to meet the desired result; ability to apply modern design methods for this purpose.	x				
	4	Ability to devise, select, and use modern techniques and tools needed for engineering practice; ability to employ information technologies effectively.	x				
	5	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating engineering problems.	x				
	6	Ability to work efficiently in intra-disciplinary teams.				x	
	7	Ability to work efficiently in multi-disciplinary teams;	x				
	8	Ability to work individually.				x	
	9	Ability to communicate effectively in Turkish/English, both orally and in writing; Ability to write effective reports and comprehend written reports, make effective presentations,				x	
	10	prepare design and production reports, give and receive clear and intelligible instructions.	x				
	11	Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to continue to educate him/herself.		x			
	12	Awareness of professional and ethical responsibility.				x	
	13	Information about business life practices such as project management, risk management, and change management.			x		
	14	Information about awareness of entrepreneurship, innovation, and sustainable development.		x			
	15	Knowledge about contemporary issues and the global and societal effects of engineering practices on health, environment, and safety.				x	
	16	Knowledge about awareness of the legal consequences of engineering solutions.			x		
	17	Knowledge on standards used in engineering practice.			x		
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