

DEPARTMENT OF ENERGY SCIENCE AND TECHNOLOGY
COURSE SYLLABUS

Course Details				
Code	Academic Year			Semester
EBT324	2			4
Title	T	A	L	ECTS
Heterogeneous Catalysis	2	2	0	6
Language	German			
Level	Undergraduate	X	Graduate	Postgraduate
Department / Program	Energy Science and Technology			
Forms of Teaching and Learning	Face-to-face			
Course Type	Compulsory		Elective	X
Objectives	The course aims to provide students with knowledge about catalysts, catalytic reactions, and the characterization of catalysts.			
Content	The course covers general information on catalysis and catalysts. It provides knowledge on homogeneous catalysis, heterogeneous catalysis, adsorption, adsorption isotherms, applications of adsorption, mechanisms and kinetics of heterogeneous catalytic reactions, important heterogeneous catalytic reactions, mechanisms and kinetics of reactions catalyzed by enzymes, and characterization methods for catalysts.			
Prerequisites	No			
Coordinator	Assist. Prof. Dr. Meltem Karaismailoğlu Elibol			
Lecturer(s)	Assist. Prof. Dr. Meltem Karaismailoğlu Elibol			
Assistant(s)				
Work Placement	No			
Recommended or Required Reading				
Books / Lecture Notes	Fogler, H. S. (1999). Elements of chemical reaction engineering. Upper Saddle River, N.J. :Prentice Hall PTR Thomas J. M. ve Thomas W. J. (2015). Principles and practise of heterogeneous catalysts, VCH Behr A., Agar D. W. Ve Jörissen J. (2009). Einführung in die Technische Chemie, Springer Niemantsverdriet J. W. (2007). Spectroscopy in Catalysis, VCH			
Other Sources	1. Fogler, H. S. (1999). Elements of chemical reaction engineering. Upper Saddle River, N.J. :Prentice Hall PTR 2. Thomas J. M. ve Thomas W. J. (2015). Principles and practise of heterogeneous catalysts, VCH 3. Behr A., Agar D. W. Ve Jörissen J. (2009). Einführung in die Technische Chemie, Springer 4. Niemantsverdriet J. W. (2007). Spectroscopy in Catalysis, VCH			
Additional Course Material				
Documents				
Assignments				
Exams				

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Course Composition			
Mathematics und Basic Sciences		%	
Engineering		%	
Engineering Design		%	
Social Sciences		%	
Educational Sciences		%	
Natural Sciences	100	%	
Health Sciences		%	
Expert Knowledge		%	
Assessment			
Activity	Count	Percentage (%)	
Midterm Exam	1	30	
Quiz			
Assignments			
Attendance			
Recitations			
Projects	1	20	
Final Exam	1	50	
	Total	100	
ECTS Points and Work Load			
Activity	Count	Duration	Work Load (Hours)
Lectures	14	2	28
Self-Study	14	6	84
Assignments			
Presentation / Seminar Preparation			
Midterm Exam	1	2	2
Recitations	14	2	28
Laboratory			
Projects	12	2	24
Final Exam	1	2	2
		Total Work Load	168
		ECTS Points (Total Work Load / Hours)	6
Learning Outcomes			
1	Ability to apply mathematics, natural science and its applications		
2	The consciousness of life-long learning necessity		

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3	Professional and ethical responsibility								
4	Ability to communicate effectively								
Weekly Content									
1	Historical development of surface science and catalysis, general information about catalysis and catalysts								
2	Homogeneous catalysis								
3	Heterogeneous catalysis								
4	Adsorption, adsorption of gases on solid materials								
5	Adsorption isotherms, adsorption of dissolved materials on solids								
6	Adsorption and its application								
7	Mechanism and kinetics of heterogeneous catalytic reactions								
8	Important heterogeneous catalytic reactions								
9	Midterm								
10	Enzymatic catalysis								
11	Mechanism and kinetics of enzymatic reactions								
12	Catalysts characterization methods								
13	Catalysts characterization methods								
14	Project work								
15	Project work								
Contribution of Learning Outcomes to Program Objectives (1-5)									
	P1	P2	P3	P4	P5	P6	P7	P8	P9
1	4	4	4	4	4	4	4	4	4
2	4	4	4	4	4	4	4	4	4
3	4	4	4	4	4	4	4	4	4
4	4	4	4	4	4	4	4	4	4
Contribution Level	1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High								
Compiled by:	Assist. Prof. Dr. Meltem Karaismailoğlu Elibol								
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