1. Course Description

COURSE DESCRIPTION FORM	
Course Code and Title	KM459 REACTOR DESIGN
Course Semester	7
Catalog Description (Content) of the Course	Steady and unsteady homogeneous flow reactors, multiphase reactor systems. Rate and selectivity for multiple reactions. Non-ideal flow reactors. Industrial reactor. Optimization, safety and economy. Reactor design. Design projects.
Main Textbook	Levenspiel, O., "Chemical Reaction Engineering", Third Edition, John Wiley &Sons Pub., 1999.
Supporting Textbooks	Smith, J.M., "Chemical Engineering Kinetics", 3rd Edition, Mc Graw Hill, 1981. Fogler, H.S., "Elements of Chemical Reaction Engineering", Prentice Hall Inc., 1992. Denbigh, K.G., Turner, J.C.R., "Chemical Reactor Theory", Cambridge University Press, 1971. Hill, C.G. Jr., "An Introduction to Chemical Engineering & Reactor Design", John Wiley& Sons, 1977.
Course Credit (ECTS)	4
Prerequisites of the Course (Compulsory attendance should be indicated here.)	no prerequisite Compulsory attendance is 70%
Type of the Course	Elective
Instruction Language of the Course	Turkish
Object and Target of the Course	To teach fundamental concepts of non-ideal flow reactors and heterogenous reaction systems and to give the concept of reaction modelling
Learning Outcomes of the Course	To improve; The ability to use the knowledge in mathematics, science and engineering The ability to identify and mathematically formulate a system, a device or a process; to identify, formulate and solve engineering problems;
Mode of Delivery	Face to face education
Weekly Schedule of the Course	1. week: Steady State Operation of Homogeneous Flow Reactors 2. week: Unsteady State Operation of Homogeneous Flow Reactors 3. week: Energy Balance 4. week: Residence Time Distribution in Non-Ideal Flow Reactors 5. week: Axial Dispersion in Tubular Reactors 6. week: Design Equations for Non-ideal Reactors 7. week: Design Equations for Non-ideal Reactors 8. week: Introduction to Heterogenous Reaction Systems 9. week: Introduction to Heterogenous Reaction Systems 10. week: Diffusion Limitations in Heterogeneous Systems 11. week: Isothermal and Non-Isothermal Operation of Packed Bed Reactors 12. week: Isothermal and Non-Isothermal Operation of Packed Bed Reactors 13. week: Projects, Reactor Modelling 14. week: Projects, Reactor Modelling

Educative Activities
(Credit will be determined based on the time given for these activities. Should be filled carefully.)

Theoretical Study Hours of Course Per Week
Reading
Searching in Internet and Library
Preparing Reports
Mid-Term and Studying for Mid-Term
Final and Studying for Final

Assessment Criteria

	Quantity	**Total Contribution (%)**
Midterm	2	40
Homework	2	5
Assignment		
Projects	1	15
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
Reading	8	3	24
Searching in Internet and Library	7	2	14
Preparing Homeworks	2	2	4
Mid-Term and Studying for Mid-Term	2	5	10
Final and Studying for Final	1	6	6
Total work load			100
Total work load/25			4
ECTS of the course			4

Course's Contribution To Program

No	Program Learning 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		X			

		engineering practice; ability to employ information technologies effectively.					
	5	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating engineering problems.					
	6	Ability to work efficiently in intra-disciplinary teams.			X		
	7	Ability to work efficiently in multi-disciplinary teams;					
	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.					
	12	Awareness of professional and ethical responsibility.					
	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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