COURSE DESCRIPTION FORM	
Course Code and Title	**KMP565-PHYSICAL AND CHEMICAL PROCESSES**
Course Semester	1
Catalog Content	Relationships between design parameters in process equipment. Transfer of fluids and transfer equipment. Temperature, pressure and phase change processes and equipment. Separation processes. Chemical reactions and reactors. Various chemical processes in industry. Enforcement of equipment specification by changes in operating parameters and control of change. Evaluation of loss of containment in process equipments.
Main Textbook	• Perry, R.H., Green, D.W., "Perry's Chemical Engineers' Handbook", Seventh ed., McGraw-Hill, New York (1998).
Supplementary Textbooks	• Peters, M.S., Timmerhaus, Klaus D., West, Ronald E. "Plant Design and Economics for Chemical Engineers," 5th ed., McGraw-Hill, New York (2003). • McCabe, J.H, Smith, C.J., Harriot, H, "Unit Operations of Chemical Engineering", McGraw Hill Book Co., 7th Edition, Boston, 2005. • Geankoplis, C.J., "Transport Processes and Separation Process Principles (Includes Unit Operations)", 4th Edit., Prentice Hall Book Co., London, 2003. • Wilke, O.J., "Fluid Mechanics for Chemical Engineers", Prentice Hall, New Jersey, 2001. • Foust, A.F., et al., "Principles of Unit Operations", 2nd Edition, John Wiley & Sons Book Co. New York, 1980.
Course Credit (ECTS)	6
Pre-Requisites And Co-Requisites	-
Type of the Course	Compulsory
Language of Instruction	Turkish
Object and Target of the Course	• To gain theoretical information about the execution of processes applied in processes where chemicals are used. • Evaluating how changes in process parameters push equipment limits.
Course Learning Outcomes	• Refers to the working methods of equipment in processes. • Express the effects of processes and equipment on safety. • Interpret the possible causes and effects of deviation from operating conditions in process equipment. • Determines and implements measures to eliminate possible deviations from operating conditions in process equipment.
Mode of Delivery	Lecture, Question & Answer, Demonstration
Weekly Schedule	1st Week **Relations in Design Parameters in Process Equipments**

	2nd Week	**Fluid Transfer** Evaluation of parameters in the transfer equipment / process design equations in the process. Evaluation of possible changes in operating parameters and their effects. - Transfer of compressed/incompressible fluids in pipes (Laminar/Turbulent Flow, Friction).
	3rd Week	**Temperature, Pressure and Phase Change Processes** Evaluation of parameters in heat transfer equipment/processes design equations. Evaluation of possible changes in operating parameters and their effects. - Heat processing equipment - Pressure change equipment (heat exchanger, furnace, pump, compressor, etc.) - Heating, cooling and phase change processes - Pressurization and pressure reduction - Evaporation
	4th Week	**Temperature, Pressure and Phase Change Processes** - Heat processing equipment - Pressure change equipment (heat exchanger, furnace, pump, compressor, etc.) - Heating, cooling and phase change processes - Pressurization and pressure reduction - Evaporation
	5th Week	**Separation Processes** Evaluation of parameters in separation equipment/processes design equations. Evaluation of possible changes in operating parameters and their effects. -Distillation (Batch Distillation and Continuous Distillation)
	6th Week	**Separation Processes** -Absorption
	7th Week	**Separation Processes-Midterm** -Extraction and Leaching
	8th Week	**Separation Processes** -Adsorption, Membrane separation processes
	9th Week	**Chemical Reactions and Reactors** Evaluation of parameters in reaction equipment/process design equations. Evaluation of possible changes in operating parameters and their effects. - Reaction rate, reaction equilibrium, reaction temperature. - Endothermic-Exothermic reactions,
	10th Week	**Chemical Reactions and Reactors** - Batch, homogeneous and heterogeneous reactors
	11th Week	**Chemical Reactions** - Batch, homogeneous and heterogeneous reactors

	12th Week **Chemical Reactions and Reactors** - Thermal control loss 13th Week **Loss Of Containment Evaluation-Midterm** 14th Week **Various Chemical Processes in the Industry** - Nitration, Halogenation, Sulphonation and sulphation, Oxidation, Hydrogenation, Esterification, Hydrolysis, Alkylation, Polymerization, 15th Week **Final Exam**
Educative Activities	Theoretical Study Hours of Course Per Week : 3 Practical Study Hours of Course Per Week : - Reading : - Searching in Internet and Library : 3 Material Design and Application : - Preparing Reports : 4 Preparing Presentations : - Presentations : - Midterms and Studying for Midterms : 3 Final and Studying for Final : 2

Assessment Criteria

	Quantity	Total Contribution (%)
Midterms	2	50
Homework	3	10
Applications	-	-
Projects	-	-
Practices	-	-
Quizzes	-	-
Contribution of In-term Studies to Overall Grade		60
Contribution of Final Examination to Overall Grade	1	40

	Attendance	-	

Workload of the Course

Activity	Total Number of Weeks	Duration (Weekly Hour)	Total Period Workload
Weekly Theoretical Course Hours	14	3	42
Weekly Practical Course Hours	-	-	-
Reading Tasks	-	-	-
Searching in Internet and Library	14	3	42
Material Design and Application	-	-	-
Preparing Reports	4	4	16
Preparing Presentations	-	-	-
Presentations	-	-	-
Midterms and Studying for Midterms	12	3	36
Final and Studying for Final	2	2	4
Other	-	-	-
Total Workload			140
Total Workload / 25			5.6
Course Credits (ECTS)			6

Course's Contribution to Program

No	Program Learning Outcomes	1	2	3	4	5
1	Developing undergraduate level competencies and deepening their knowledge to apply in the field of process safety			X		
2	Understanding the undergraduate competencies and the interaction between the competencies gained in this program and the disciplines related to process safety	X				
3	Using the expert level theoretical and applied knowledge acquired in the field of process safety		X			

	4	Developing the competencies gained at the undergraduate level and integrating the information gained in the field of process safety with the information from the relevant disciplines and creating new knowledge	X					
	5	Solving process safety problems using scientific research methods	X					
	6	Independently conducting studies that require expertise in the field of process safety	X					
	7	Developing new approaches to complex problems encountered in applications in the field of process safety	X					
	8	Taking responsibility and generating solutions for complex problems encountered in applications in the field of process safety			X			
	9	Taking initiative in environments that require resolution of problems related to process safety	X					
	10	Critically evaluating the information acquired about process safety and directing learning		X				
	11	Ability to systematically transfer the developments and own studies in the field of process safety in written, oral and visual forms					X	
	12	Developing social relations and the set of values that direct these relationships with a critical approach and transforming them when necessary	X					
	13	Establishes oral and written communication using a foreign language (European Language Portfolio B2 level)	X					
	14	Uses computer software at the level required by the process safety field	X					
	15	Uses advanced information and communication technologies at the level required by the field of process safety	X					

	16	Collecting, interpreting, finalizing the data on process safety, applying and sharing them with respect to ethical values	X				
	17	Developing different perspectives on process safety issues, setting policies, making plans and evaluating the results within the framework of quality	X				
	18	Internalizing the knowledge gained in the field of process safety with the competencies gained at the undergraduate level, turning it into skills and using it in interdisciplinary studies		X			
Name of Lecturer(s) and Contact Information	Faculty Members of the Chemical Engineering Department						