COURSE DESCRIPTION FORM	
Course Code and Title	**KMP560-FIRE, EXPLOSION AND DISPERSION**
Course Semester	2
Catalog Content	Fire chemistry. Fire and explosion types. Sources of ignition. Fire response. Prevention/suppression systems. Protection from explosion. Dispersion maps and response dispersion. Loss of containment (LOC) evaluation.
Main Textbook	• Nolan, D.P., Handbook of Fire and Explosion Protection Engineering Principles for Oil, Gas, Chemical and Related Facilities, 4th ed., 2019.
Supplementary Textbooks	• Eckhoff, R.K., Explosion Hazards in the Process Industries, 2nd ed., 2016. • DeVaull, G.E., King, J.A., Lantzy, R.J., Fontaine, D.J., Understanding Atmospheric Dispersion of Accidental Releases: A CCPS Concept Book., 1995. • Crowl, D.A, Louvar, J.F., Chemical Process Safety Fundamentals with Applications, 2nd ed., Prentice Hall, 2002.
Course Credits (ECTS)	6
Pre-Requisites And Co-Requisites	-
Type of the Course	Compulsory
Language of Instruction	Turkish
Object and Target of the Course	• To gain the necessary theoretical knowledge to develop methods for combating fire, explosion and exposure.
Course Learning Outcomes	• Evaluates fire and explosion risks. • Determines fire and explosion safety systems. • Suggests approaches to prevent exposure and control additional risks. • Evaluates loss of containment. • Uses software related to creating exposure maps.
Mode of Delivery	Lecture, Question & Answer, Demonstration
Weekly Schedule	1st Week **Combustion and Fire** - Combustion Chemistry - Types of Combustion - Fire Stages - Effects of Fire-Hazards at the Site of Fire - Fire and Causes of Fire 2nd Week **Types of Fire** - Flash fire, jet fire, boilover etc. 3rd Week **Explosion and Explosion Types** - Physical, Nuclear and Chemical Explosions (boiling liquid expanding vapor explosion, unstable chemicals explosion, vapor cloud explosion, ATEX)

	4th Week	**Explosion and Explosion Types** - Physical, Nuclear and Chemical Explosions (boiling liquid expanding vapor explosion, unstable chemicals explosion, vapor cloud explosion, ATEX)
	5th Week	**Loss of Containment (LOC) Evaluation** - Types of fluid release - Calculation release rates of fluids
	6th Week	**Explosion Protection** - Explosion Protection Document
	7th Week	**Explosion Protection-Midterm** - Explosion Protection Document
	8th Week	**Fire Response** - Fire Response Principles - Fire Response Equipments - Considerations for Response According to the Type of Fire
	9th Week	**Fire Response** - Fire Detection Systems - Smoke Evacuation Systems - Pressurization Systems - Fire Response Systems
	10th Week	**Accident Scenarios and Emergencies in Chemical Processes** - Preparation of Fire Scenarios - Fire Emergency Exercises
	11th Week	**Dispersion** - Factors affecting dispersion (Wind, atmospheric stability, turbulence, etc.) - Inversion - Mapping
	12th Week	**Disposure and Its Damages-Midterm** - Factors affecting dispersion (Wind, atmospheric stability, turbulence, etc.) - Inversion - Mapping -The damages of dispersion and its control
	13th Week	**Industrial Fire, Explosion and Dispersion Case Studies** - Presentations
	14th Week	**Industrial Fire, Explosion and Dispersion Case Studies** - Presentations
	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 : 3 Preparing Reports : 2 Preparing Presentations : 2 Presentations : 1 Midterms and Studying for Midterms : 3 Final and Studying for Final : 2

Assesment Criteria

	Quantity	Total Contribution (%)
Midterms	2	30
Assignments	1	10
Applications	-	-
Projects	2	20
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	3	3	9
Preparing Reports	2	2	4

	Preparing Presentations	2	2	4
	Presentations	1	1	1
	Midterms and Studying for Midterms	12	3	36
	Final and Studying for Final	2	2	4
	Other	-	-	-
	Total Workload			142
	Total Workload / 25			5.68
	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