COURSE DESCRIPTION FORM	
Course Code and Title	**KMP564-PROCESS CONTROL SYSTEMS**
Course Semester	2
Catalog Content	Process control systems. Basic process control systems. Safety-instrumented systems. Functional safety. Risk concepts. Safety integrity concepts. Secure life cycle.
Main Textbook	• Center for Chemical Process Safety (CCPS). (2010). Guidelines for safe and reliable instrumented protective systems. John Wiley & Sons.
Supplementary Textbooks	• Coughanowr, D. R., & Koppel, L. B. (1965). Process systems analysis and control (Vol. 491). New York: McGraw-Hill. • Peters, M. S., Timmerhaus, K. D., & West, R. E. (1968). Plant design and economics for chemical engineers (Vol. 4). New York: McGraw-Hill. • Related standards (EN61508, EN61511).
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 teach the approach to identify and control process-specific risks. • To teach the working principles of process control systems to sustain production. • To teach the working principles and selection principles of safety-instrumented systems for the prevention of accidents.
Course Learning Outcomes	• Explains the concept of safety life cycle. • Defines the concepts related to safety-instrumented systems. • Determines the safety containment level. • Performs the installation, verification and periodic control of safety-instrumented systems.
Mode of Delivery	Lecture, Question & Answer, Demonstration
Weekly Schedule	1st Week **Process Control Systems Definitions: Risk Reduction Concept, Risk Reduction Parameters and Tolerable Risk Concept** - Basic process control systems (BPCS) - Safety instrumented systems (SIS) 2nd Week **Basic Process Control Systems** 3rd Week **Functional SAFETY and the Role of IEC61508/IEC61511 in Ensuring Functional Safety**

		and Safety Life Cycle
	4th Week	**Safety Instrumented Function (SIF)**
	5th Week	**The Role of Safety Instrumented Systems (SIS) in Reaching Tolerable Risk**
	6th Week	**The Role of Other Engineering Precautions and Risk Parameters in Reaching Tolerable Risk**
	7th Week	**Safety Containment and Safety Integrity Level (SIL)**
	8th Week	**Safety Integrity Level Determination Concepts and Methods** -Qualitative methods - Risk chart method
	9th Week	**Safety Integrity Level Determination Concepts and Methods-Midterm** -LOPA method -Dangerous incident intensity matrix method
	10th Week	**Hardware Failure Tolerance (HFT) and Safe Failure Fraction (SFF)**
	11th Week	**Design and engineering of Safety Instrumented Systems** -Defining the purpose -Organization and determination of resources -Requirements for fault databases, sensor, logic, final element, auxiliary units
	12th Week	**Installation and Verification of Safety Instrumented Systems**
	13th Week	**Operation, Maintenance and Periodical Control of Safety Instrumented Systems**
	14th Week	**A Case Study and Presentation Safety Instrumented Systems**
	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 : 6 Material Design and Application : - Preparing Reports : 3	

	Preparing Presentations : 3 Presentations : 3 Midterms and Studying for Midterms : 5 Final and Studying for Final : 3

Assesment Criteria

	Quantity	Total Contribution (%)
Midterms	1	30
Assignments	-	-
Applications	-	-
Projects	1	30
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	6	84
Material Design and Application	-	-	-
Preparing Reports	2	3	6
Preparing Presentations	1	3	3
Presentations	1	3	3
Midterms and Studying for	1	5	5

	Midterms			
	Final and Studying for Final	2	3	6
	Other	-	-	-
	Total Workload			149
	Total Workload / 25			5,96
	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						