

## COURSE GUIDE

<u>Subject name</u>	<b>Safety of process installations</b>
<u>Course of study</u>	<b>Quality and Production Management</b>
<u>The form of study</u>	<b>Full-time</b>
<u>Level of qualification</u>	<b>First</b>
<u>Year</u>	<b>II</b>
<u>Semester</u>	<b>IV</b>
<u>The implementing entity</u>	<b>Katedra Innowacji i Systemów Zarządzania Bezpieczeństwem</b>
<u>The person responsible for preparing</u>	<b>dr hab. inż Wioletta Bajdur, Prof. PCz dr had. inż Jarosław Jasinski</b>
<u>Profile</u>	<b>General academic</b>
<u>ECTS points</u>	<b>4</b>

### TYPE OF TEACHING – NUMBER OF HOURS PER SEMESTER

LECTURE	CLASS	LABORATORY	PROJECT	SEMINAR
<b>15</b>	<b>30</b>	-	-	-

### COURSE AIMS

- C1. To acquaint students with the risks of processes related to industrial disasters and failures.
- C2. To familiarize students with the characteristics of various security elements related to the design and operation of process installations.
- C3. Providing students with practical knowledge in the field of security systems for increased and high risk plants.

### ENTRY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. The student knows the basic principles of health and safety at work and environmental protection.
2. The student has the basic ability to analyze cause and effect relationships in the range of interactions of various factors on the state of safety in the work process.
3. The student knows the basic concepts related to occupational risk.

### LEARNING OUTCOMES

- EU1. The student knows the types of security measures used in process installations.
- EU2. The student knows the technical and legal requirements regarding various security measures both in relation to machinery, equipment and process installations as well as infrastructure.
- EU3. Student is able to analyze hazards related to process installations.
- EU4. Student is able to choose prophylactic activities and appropriate security measures for typical process installations

### COURSE CONTENT

Type of teaching – LECTURE	Number of hours
W1. Introduction, basic concepts and terminology.	1
W2,W3. Current state of legal regulations concerning the prevention of serious industrial failures.	2
W4. Elements of process safety management.	1
W5. Risk assessment and management, technological risk.	1
W6,W7. Failure mechanisms. Most dangerous factors and substances that cause failures.	2
W8. Factors that increase the risk and result in failure.	1
W9. Threats of serious industrial failures in Poland.	1
W10,W11. The main elements of the system for preventing serious industrial accidents.	2

Classification of plants due to the threat of failures.	
W12,W13. Increased and high risk of industrial failure - the main elements of the safety management system.	2
W14. Process safety systems and principles of system design.	1
W15. Technical security measures in the prevention of failures.	1
<b>Form of classes - CLASS</b>	<b>Number of hours</b>
C1. Introduction, basic concepts, organization of students' own work.	1
C2,C3. Analysis of fire safety instructions. Fire and explosion hazards.	2
C4,C5. Escape routes. Legal requirements, marking. Health and safety in buildings, fire protection.	2
C6,C7. Environmental Protection Law, scope, selected regulations and requirements.	2
C8,C9. Hazardous substances used in production processes.	2
C10,C11. Provisions regarding trans-border effects of industrial accidents.	2
C12-C16. Risk management, standards, risk assessment methodologies.	5
C17-C18. Ecological risk and process installations.	2
C19-C20. Factors deepening the effects of industrial failure.	2
C21-C25. Analysis and assessment of the safety of plants belonging to groups of increased or high risk of a serious industrial accident.	5
C26-C29. Analysis of exemplary reports on failures and their consequences in the industry aspect.	4
C30. Knowledge verification.	1

### TEACHING TOOLS

1. Manual.
2. Legal acts and standards.
3. CIOP studies and materials.
4. Audio-visual equipment.
5. Internet.

### WAYS OF ASSESSMENT (F – FORMATIVE, P – SUMMATIVE)

- F1. Active participation in classes.  
F2. Evaluation of elaborations of selected topics.  
P1. Check test.

### STUDENT WORKLOAD

Form of activity		The average number of hours to complete the activity		
		[h]	ECTS	ECTS
Contact hours with Lecture guide	Lecture	15	0.6	1.08
Preparation for test		12	0.48	
Contact hours with Lecture guide	Class	30	1.2	1.8
Preparation for exercises		15	0.6	
Familiarization with the literature		15	0.6	0.6
Consultation		13	0.52	0.52
<b>TOTAL NUMBER OF HOURS / ECTS POINTS FOR SUBJECT</b>		<b>100</b>	<b>4</b>	

### BASIC AND SUPPLEMENTARY RESOURCE MATERIALS

#### Basic resources

1. Prevention of major industrial accidents - International Labour Office Geneva, 1991.
2. Institution of Chemical Engineers (IChemE): Nomenclature for hazard and risk assessment in the process industries (Rugby, Warwickshire, 1985).

3. Safety in the installation and use of gas systems and appliances - Health and Safety Executive, Fourth edition 2013.

#### Supplementary resources

1. Electrical installation guide - Schneider Electric S.A., March 2008.
2. A Practical Guide to Machinery Safety - PPMA - TÜV SÜD Product Service, Edition 4.
3. Installations manuals (offshore, gas, electrical, chemical) - internet resources.

#### TEACHERS (NAME, SURNAME, E-MAIL ADDRESS)

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#### MATRIX OF LEARNING OUTCOMES REALISATION

Learning outcome	Reference of given outcome to outcomes defined for whole program (PRK)	Course aims	Course content	Teaching tools	Ways of assessment
EU1	K_W01, K_W02, K_W03, K_W08, K_W10, K_U01, K_U02, K_U04, K_U05, K_U10, K_U11, K_K02	C1, C3	W1, W4, W10, W11, W14, W15, C1-C3 C12- C16	1, 2,4,5	F1, F2, P1
EU2	K_W01, K_W02, K_W03, K_W05, K_W08, K_W10, K_U01, K_U02, K_U04, K_U05, K_U10, K_U11, K_K02	C2, C3	W1, W2, W4, W10 - W13, C1, C4-C11, C30	1, 2, 3,4	F1, P1
EU3	K_W01, K_W02, K_W03, K_W07, K_W08, K_W10, K_U01, K_U02, K_U04, K_U05, K_U09, K_U10, K_U11, K_K02	C2, C3	W1, W5, W6, W7- W9, W14, C17-C25, C30	1, 2,3,4,5	F1, F2, P1
EU4	K_W01, K_W02, K_W03, K_W08, K_W10, K_U01, K_U02, K_U04, K_U05, K_U10, K_U11, K_K02	C1, C2, C3	W1-W3, W5, W10, W11, W14, W15 C21- C30	1, 2, 3,4,5	F1, F2, P1

#### FORM OF ASSESSMENT - DETAILS

	grade 2	grade 3	grade 4	grade 5
EU1	The student does not know the basic types of security measures used in process installations.	The student knows the basic types of security measures.	The student knows the types of security measures, can divide into individual and collective protection.	The student knows the types of security measures, including individual and collective protection measures. He can determine the role of organizational activities.
EU2	The student does not know the technical and legal requirements regarding various security measures both in relation to machinery, equipment and process installations as well as infrastructure.	The student knows the basic technical and legal requirements for typical security measures.	The student knows the technical and legal requirements regarding various security measures both in relation to machines, devices or installations as	The student knows the technical and legal requirements regarding various security measures both in terms of installation and infrastructure, and is able to analyze their correlation.

			well as infrastructure.	
<b>EU3</b>	The student can not analyze the hazards associated with process installations.	The student is able to analyze the threats. He knows some types of technical security measures.	The student is able to analyze hazards in the aspect of choosing the right security measures.	The student is able to analyze hazards and select security measures. He can determine their relationship with organizational measures.
<b>EU4</b>	The student can not choose preventive activities and appropriate security measures for typical process installations.	The student can propose appropriate security measures for typical process installations.	The student is able to choose the right security measures for typical process installations and point out the basic elements of prophylaxis.	Student is able to choose prophylactic activities and appropriate security measures for the installation and knows the principles of cooperation with emergency services.

#### **ADDITIONAL USEFUL INFORMATION ABOUT THE COURSE**

1. Information where presentation of classes, instruction, subjects of seminars can be found, etc. - presented to students during first classes, if required by the formula classes are sent electronically to the e-mail addresses of individual dean groups.
2. Information about the place of classes - Information can be found on the website of the Faculty of Management.
3. Information about the timing of classes (day of the week / time) - Information can be found on the website of the Faculty of Management.
4. Information about the consultation (time + place) - Information can be found on the website of the Faculty of Management.