

## COURSE GUIDE

<u>Subject name</u>	<b>Industrial waste management</b>
<u>Course of study</u>	<b>Quality &amp; Production Management</b>
<u>The form of study</u>	<b>Full-time</b>
<u>Level of qualification</u>	<b>I</b>
<u>Year</u>	<b>II</b>
<u>Semester</u>	<b>4</b>
<u>The implementing entity</u>	<b>Department of Production Engineering and Safety</b>
<u>The person responsible for preparing</u>	<b>dr inż. Marek Krynke</b>
<u>Profile</u>	<b>General academic</b>
<u>Course type</u>	<b>elective</b>
<u>ECTS points</u>	<b>3</b>

### TEACHING METHODS – NUMBER OF HOURS PER SEMESTER

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

## COURSE AIMS

- C1. To provide students with knowledge of the classification of waste and selected principles of waste management.
- C2. To familiarize students with the current legal regulations and economic mechanisms of waste management in Poland.
- C3. To familiarize students with methods and techniques of neutralization and waste disposal on selected examples.
- C4. Students acquire practical skills in using the knowledge of basic methods and techniques used in waste management.

## ENTRY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Student has general knowledge of basic environmental issues.
2. The student knows the global threats to the environment and is able to analyze the relationships between these threats.
3. Student has the ability to create a strategy of environmental protection with respect to nature conservation.

## LEARNING OUTCOMES

- EK 1- The student is able to classify and characterize the waste according to various criteria in accordance with the waste catalog.
- EK 2- The student is able to use the knowledge of the applicable legal regulations, the basic assumptions of environmental policy and economic mechanisms in waste management.
- EK 3- Student can use the principles of waste management and can analyze methods and techniques of disposal, storage and organization of recycling.

## COURSE CONTENT

Type of teaching – LECTURES 15HOURS	Number of hours
W 1 - Waste management - introduction, basic concepts and issues	1
W 2 - Classification and properties of waste	1
W 3 - Characteristics and technological properties of municipal waste	1
W 4 - Characteristics and properties of industrial waste.	1
W5 - Management of hazardous waste	1
W 6 - Current legal status. Laws and regulations on waste	1
W 7 - Limiting the formation of waste	1
W 8 - Storage and transport of waste	1
W 9, W 10 - Methods of waste utilization	2
W 11, W 12 - Methods of waste disposal and recycling	2
W 13, W 14 - Waste information systems. Management of waste management in enterprises. Waste management of Poland and the policy of the European Union	2
W 15 - Integrated waste management systems, development perspectives	1
Type of teaching – CLASS 15HOURS	Number of hours
C1 - Introduction, student work organization	1
C2, C3 - Analysis of issues related to municipal waste, discussion and filling of waste documentation	2

C4, C5 - Analysis of issues related to industrial and hazardous waste, discussion and filling of waste documentation	2
C6, C7- Possible safeguards in dealing with municipal, industrial and hazardous waste on selected examples	2
C8, C9 - Ways to limit waste and landfill. Statistics. Principles of location of landfills, discussion of examples	2
C10, C11 - Analysis of methods of utilization and disposal of waste on selected examples	2
C12 - Analysis of the recycling process on selected examples	1
C13, C14 - Management of waste management on the example of the selected plant	2
C15 - Test	1

### TEACHING TOOLS

1. Books and monographs
2. Audiovisual presentation
3. Case study

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

- F1. Evaluation of the implementation tasks in the classroom.  
 F2. Observation of students' work in the classroom.  
 P1. Final test.

### STUDENT WORKLOAD

Form of activity		Average number of hours for realization of the activity		
		[h]	ECTS	ECTS
Contact hours with the teacher	LECTURE	15	0.6	1.2
Preparation for exam		15	0.6	
Contact hours with the teacher	CLASS	15	0.6	1
Preparation of the CLASS		10	0.4	
Getting Acquainted with the indicated literature		15	0.6	0.6
Consultation		5	0.2	0.2
<b>TOTAL NUMBER OF HOURS / ECTS POINTS FOR THE COURSE</b>		<b>75</b>	<b>3</b>	

### BASIC AND SUPPLEMENTARY RESOURCE MATERIALS

#### BASIC

1. Ram Chandra. Environmental Waste Management. CRC Press. 2016.
2. John Pichtel: Waste Management Practices. Municipal, Hazardous and Industrial. CRC Press 2005.
3. Chandrappa Ramesha, Brown Jeff: Solid Waste Management. Principles and Practice. Springer Science & Business Media, 2012.
4. Szymański K.. Gospodarka odpadami komunalnymi. Wydaw. Uczelniane Politechniki Koszalińskiej, 2014.
5. Rosik – Dulewska Cz., Podstawy gospodarki odpadami, Wydawnictwo PWN, 2007r.

#### SUPPLEMENTARY

1. Lawrence K. Wang, Nazih K. Shamas, Yung-TseHung. Advances in HazardousIndustrial Waste Treatment. CRC Press 2008.
2. Lawrence K. Wang, Yung-TseHung, Howard H. Lo, ConstantineYapijakis. Waste Treatment in the ProcessIndustries. CRC Press, 2005.
3. Poskrobko B. (red.), Zarządzanie środowiskiem w Polsce, Polskie Wydawnictwo Ekonomiczne, Warszawa, 2012.

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

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#### MATRIX OF LEARNING OUTCOMESREALISATION

Learning outcome	Reference of given outcome to outcomes defined for whole program	Course aims	Course content	Teaching tools	Ways of assessment
<b>EK 1</b>	K_W02, K_W05, K_W08, K_U02, K_U05, K_U10, K_K01, K_K02	C1	W1-W5, C1 –C5	1, 2,3	F1, F2, P1
<b>EK 2</b>	K_W02, K_W03, K_W05, K_W08, K_U07, K_U9, K_K01, K_K02, K_K03	C1, C2	W6, W13-W15, C 4- - C7, C13, C14	1, 2,3	F1, F2
<b>EK 3</b>	K_W02, K_W03, K_W05, K_W08, K_W09, K_U04, K_U05, K_U07, K_U10 K_K02, K_K04, K_K05	C3, C4	W1, W7- W15, C2 – C15	1,2,3	F1, F2, P1

#### FORM OF ASSESSMENT - DETAILS

	grade 2	grade 3	grade 4	grade 5
EK 1	A student can not characterizeorclassifiy waste.	The student isable to classifyonlysome of the waste, but can not characterizeit.	The student isable to classify the waste, but onlysomecancorrectl ycharacterizeit.	Student cancorrectlyclassify and characterize waste.
EK 2	The student has no knowledge of the currentlegalregulati ons, nor the basicprinciples of	The student knowsonlysome of the legalregulations, knowssomebasicpri	The student hasknowledge of the applicablelegalregul ations, canusesome of the	The student isable to use the knowledge of the currentlegalregulation s, has a

	environmental policy and economic mechanisms in waste management.	principles of environmental policy and economic mechanisms in waste management.	basic principles of environmental policy and is familiar with the economic mechanisms in the waste management.	systematic knowledge of the basic principles of environmental policy and knows and understands the economic mechanisms of waste management.
EK 3	The student has no knowledge of the principles of waste management or the methods of managing waste management in companies. It can not determine methods and techniques for the disposal, storage and organization of waste recycling.	The student is knowledgeable only about some principles of waste management and does not know how to manage waste management in companies.	He knows only some methods of waste management in companies. Student can not correctly analyze methods and techniques of waste disposal, storage and organization of waste recycling.	Student is able to use systematized knowledge about the principles of waste management and methods of waste management in enterprises. Student is able to properly analyze methods and techniques of waste disposal, storage and organization of waste recycling in an enterprise, taking into account technological processes.

**ADDITIONAL USEFUL INFORMATION ABOUT THE COURSE**

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

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Coordinator