

COURSE GUIDE

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

TYPE OF TEACHING – NUMBER OF HOURS PER SEMESTER

LECTURE	CLASS	LABORATORY	PROJECT	SEMINAR
15	15	-	-	-

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

- EU1. The student is able to classify and characterize the waste according to various criteria in accordance with the waste catalog.
- EU2. 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.
- EU3. Student can use the principles of waste management.
- EU4. Student can analyze methods and techniques of disposal, storage and organization of recycling.

COURSE CONTENT

Type of teaching – LECTURE	Number of hours
W1. Waste management - introduction, basic concepts and issues.	1
W2. Classification and properties of waste.	1
W3. Characteristics and technological properties of municipal waste.	1
W4. Characteristics and properties of industrial waste.	1
W5. Management of hazardous waste.	1
W6. Current legal status. Laws and regulations on waste.	1
W7. Limiting the formation of waste.	1

W8. Storage and transport of waste.	1
W9,W10. Methods of waste utilization.	2
W11,W12. Methods of waste disposal and recycling.	2
W13,W14. Waste information systems. Management of waste management in enterprises. Waste management of Poland and the policy of the European Union.	2
W15. Integrated waste management systems, development perspectives.	1
Type of teaching – CLASS	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
TOTAL NUMBER OF HOURS / ECTS POINTS FOR THE COURSE		75	3	

BASIC AND SUPPLEMENTARY RESOURCE MATERIALS

Basic resources

1. Pacheco Torgal F. et al. (eds.) Handbook of Recycled Concrete and Demolition Waste. Woodhead Publ. Ltd. Oxford 2013.
2. Miller F.P., Vandome A.F., M(a)cBrewster J. Recycling. VDM Publishing House. Beau Bassin 2009.
3. Hester R. E. ,Harrison R. M. Electronic Waste Management :Design, Analysis and Application. RSC Publishing. Cambridge 2009.

4. Pichtel J. Waste Management Practices :Municipal, Hazardous, and Industrial. Taylor & Francis. Boca Raton 2005.

Supplementary resources

1. Starostka-Patyk M. Logistics of Waste Flows Monograph. Valahia University Press. Targoviste 2012.
2. Alwaeli M. Municipal Solid Waste: Recycling and Cost Effectiveness. Nova Science Publishers. New York 2011.
3. Araujo Ademir S.F. Waste Management New Research. Nova Science Publishers New York 2012.
4. Li Yuan Chun. ,Wang Banci Lian. E-Waste Management. Types and Challenges. Nova Science Publishers. New York 2012.
5. Williams P. T. Waste Treatment and Disposal. John Wiley and Sons. Chichester 2005.
6. Rosak-Szyrocka J., Krynke M., Knop K.: Doskonalenie przedsiębiorstw w aspekcie czystszej produkcji i zrównoważonego rozwoju. Oficyna Wydawnicza Stowarzyszenia Menedżerów Jakości i Produkcji. Częstochowa 2017.

TEACHERS (NAME, SURNAME, E-MAIL ADDRESS)

dr inż. Marek Krynke, marek.krynke@wz.pcz.pl

dr inż. Manuela Ingaldi, manuela.ingaldi@wz.pcz.pl

dr inż. Krzysztof Knop, krzysztof.knop@wz.pcz.pl

mgr inż. Aleksandra Wrzalik, aleksandra.wrzalik@wz.pcz.pl

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_W02, K_W05, K_W08, K_U02, K_U05, K_U10, K_U11, K_K02	C1	W1-W5, C1-C5	1, 2,3	F1, F2, P1
EU2	K_W02, K_W03, K_W05, K_W08, K_U07, K_U09, K_U11, K_K02	C1, C2	W6, W13-W15, C4-C7, C13, C14	1, 2,3	F1, F2
EU3	K_W02, K_W03, K_W05, K_W09, K_U04, K_U05, K_U07, K_U10, K_K02, K_K04, K_K05	C3, C4	W1, W2, C2-C7	1,2,3	F1, F2, P1
EU4	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
EU1	A student can not characterize or classify waste.	The student is able to classify only some of the waste, but can not characterized.	The student is able to classify the waste, but only some can correctly characterize it.	Student can correctly classify and characterize waste.
EU2	The student has no knowledge of the current legal regulations, nor the basic principles of environmental policy and economic mechanisms in waste management.	The student knows only some of the legal regulations, knows some basic principles of environmental policy and economic mechanisms in waste management.	The student has knowledge of the applicable legal regulations, can use some of the basic principles of environmental policy and is familiar with the economic mechanisms in	The student is able to use the knowledge of the current legal regulations, has a systematic knowledge of the basic principles of environmental policy and knows and understands the economic

			the waste management.	mechanisms of waste management.
EU3	The student has no knowledge about the rules of waste management	The student has knowledge about only some rules of waste management.	The student has knowledge about the rules of waste management.	The student is able to use systematized knowledge on the principles of waste management and management methods.
EU4	The student has no knowledge of 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 knowledge able only about some know-how to manage waste management in companies.	He knows only some methods of waste management in companies. Student can correctly analyze methods and techniques of waste disposal, storage and organization of waste recycling.	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. - 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.