

## COURSE GUIDE

<b>Subject name</b>	<b>Waste logistics</b>
<b>Course of study</b>	<b>Logistics</b>
<b>The form of study</b>	<b>Full-time</b>
<b>Level of qualification</b>	<b>Second</b>
<b>Year</b>	<b>I</b>
<b>Semester</b>	<b>2</b>
<b>The implementing entity</b>	<b>Department of Logistics and International Management</b>
<b>The person responsible for preparing</b>	<b>Dr Joanna Krzywda</b>
<b>Profile</b>	<b>General academic</b>
<b>ECTS points</b>	<b>3</b>

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

LECTURE	CLASS	LABORATORY	PROJECT	SEMINAR
15	15	-	-	-

### COURSE AIMS

**C1.** Presentation and discussion of the concept of waste logistics, its processes, objects and subjects of interest, possibilities and effects of its application.

**C2** Characteristics of the waste management system, utilization processes and its logistic aspects.

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

The student knows the basics of logistics concept.

The student is able to characterize subsystems of logistics.

The student is able to discuss logistic processes.

The student knows the main principles of implementing logistics in enterprises and the benefits resulting from it.

The student is able to analyze numerical data (mainly statistical), present them in a graphical form and interpret them correctly.

### LEARNING OUTCOMES

EU 1 - The student knows the concept of waste logistics and can indicate differences and similarities between it and logistics and related concepts.

EU 2- The student is able to discuss waste management problems, distinguishing between municipal, industrial and hazardous waste.

EU 3- The student is familiar with waste disposal processes taking into account their logistic aspects, as well as legal and organizational conditions.

EU 4- The student is able to discuss the benefits of practical application of waste logistics processes, taking them into account in the functioning of modern companies and specialized business units.

### COURSE CONTENT

<b>LECTURES - 15 hours</b>	<b>Number of hours</b>
L 1- Introduction to the subject. Presentation of basic concepts and terms related to waste logistics and compare it to related concepts.	<b>1</b>
L 2 - Place of waste logistics in the logistic system.	<b>1</b>
L 3- Waste types, methods and techniques of waste management and disposal.	<b>1</b>
L 4- Economic, legal and social conditions of waste management.	<b>3</b>
L 5- Waste treatment and disposal methods with specific examples.	<b>2</b>
L 6 - Traditional logistics and waste logistics. Similarities and differences.	<b>1</b>
L 7- Logistics processes in waste management.	<b>3</b>
L 8- Planning logistics processes in waste management.	<b>1</b>

L 9 – Best recycling practices from around the world	<b>1</b>
L 10- Modern methods of waste management and disposal in Poland and worldwide. Examples of practical applications of waste logistics processes.	<b>1</b>
<b>Activity form - Exercises - 15 hours</b>	<b>Number of hours</b>
C 1 – Introduction. Rules of course completion, the essence and tasks of logistics and logistic processes.	<b>1</b>
C 2 – Glass waste. Methods of collection and management, logistic processes.	<b>1</b>
C 3 – Waste paper. Methods of effective collection and management, logistic processes.	<b>1</b>
C 4 – Plastics. Methods of effective collection and management, collection and recycling.	<b>1</b>
C 5 – Metals. Methods of effective collection and management, recycling of metals.	<b>1</b>
C 6 – Hazardous waste. Methods of management and disposal.	<b>1</b>
C 7 – Asbestos and electro-waste - treatment and disposal methods.	<b>1</b>
C 8 – Biomass. Place of origin, management methods, biomass as a source of alternative fuels.	<b>1</b>
C 9 – Health and veterinary wastes. Origins, types, management in the system and future development prospects.	<b>1</b>
C 10 – Electronic waste. Places of generation, types, management in the system and future development prospects.	<b>1</b>
C 11 – Batteries and accumulators. Places of origin, types, development in the system and future development prospects.	<b>1</b>
C 12 – Waste from power stations. Places of generation, types, management in the system and future development prospects.	<b>1</b>
C 13 – Chemical waste. Places of origin, types, management in the system and future development prospects.	<b>1</b>
C 14 – Content summary.	<b>1</b>
C 15 – Final test.	<b>1</b>

### TEACHING TOOLS

explanation, discussion, work with the textbook etc.

methods based on practical activities (developed in teams, examples of practical application of the principles).

activating methods (brainstorming, solving out problematic issues provided by teacher).

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

**F1** Assessment of each student's activity during classes.

**F2** Assessment of presentation.

**P1** Written test.

### STUDENT WORKLOAD

Form of activity	Average number of hours for realization of the activity
	[h]
Contact hours with the teacher	30
Preparation for lectures	10
Preparation for classes	15
Literature studies	10
Consultations	10
<b>TOTAL NUMBER OF HOURS / ECTS POINTS FOR</b>	<b>75/3</b>

<b>THE COURSE</b>	
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**BASIC AND SUPPLEMENTARY RESOURCE MATERIALS****Basic resources**

Williams, Paul T.: Waste Treatment and Disposal / Paul T. Williams, Chichester: John Wiley and Sons, Inc., 2005.

E. Kulińska. Fundamentals of logistics and supply chain management. Wydawnictwo MS. Opole 2010.

M. Starostka-Patyk Reverse logistics of defective products in management of manufacturing enterprises. Katowice, 2017.

Asefi H., Shahparvari Sh., Chhetri P., Integrated Municipal Solid Waste Management under uncertainty: A tri-echelon city logistics and transportation context, Sustainable Cities and Society, Volume 50, 209.

**Supplementary resources**

P. David, R. Stewart. *International logistics. The management of international trade operations*. Cengage Learning. Mason 2010

Krzywda J. Krzywda D. *Concept of Sustainable Development in Metallurgical Waste Transport*, in: 15th International Academic Conference, Rzym, Włochy, 2015.

**TEACHER (NAME, SURNAME, E-MAIL ADDRESS)**

Dr Joanna Krzywda, Joanna.krzywda@wz.pcz.pl

**MATRIX OF LEARNING OUTCOMES REALISATION**

<b>Learning outcome</b>	<b>Reference of given outcome to outcomes defined for whole program</b>	<b>Course aims</b>	<b>Course content</b>	<b>Teaching tools</b>	<b>Ways of assessment</b>
EU 1 The student knows the concept of waste disposal logistics and can point out differences and similarities between it, ecology and logistics and related concepts.	K_W01 K_W02 K_U01	C1	L1,L3,L4, L7,C1, C2, C3,	1,2,3	F1, P1
EU 2 The student is able to discuss waste management, distinguishing between municipal and industrial waste and hazardous waste.	K_W01 K_W02 K_U01	C1,C2	L2,L5,L6, C4,C5,C6	1,2,3	F1, P1

EU 3 The student knows the processes of utilization taking into account their logistic aspects, as well as legal and organizational conditions.	K_W01 K_W02 K_U01	C1, C2	L8,L9,C7, C8	1,2,3	F1, P1
EU 4 The student is able to discuss the benefits of practical application of utilization logistics processes, taking them into account in the functioning of modern enterprises and specialized economic units.	K_W01 K_W02 K_U01 K_U02 K_K02	C2	L10,L11,L1, L13,L14, L15, C9, C10, C11, C12, C13, C14, C15	1,2,3	F1, P1

#### FORM OF ASSESSMENT - DETAILS

	grade 2	grade 3	grade 4	grade 5
EU 1	The student does not know the basics of waste disposal logistics concept, cannot indicate differences and similarities between it and related concepts.	The student knows the basic scope of the concept of waste disposal logistics, he can barely point out differences and similarities between it and related concepts.	The student knows the scope of the concept of waste disposal logistics, can indicate the most important differences and similarities between it and related concepts.	The student knows the scope of the concept of waste disposal logistics, can indicate all differences and similarities between it and related concepts.
EU 2	The student is not able to discuss waste management, does not distinguish between municipal and industrial waste and hazardous waste.	The student is able to discuss the basic assumptions of waste management, barely distinguishing between municipal and industrial waste and hazardous waste.	The student is able to discuss the basic assumptions of waste management, distinguishes between municipal and industrial waste and hazardous waste.	The student is able to discuss all the assumptions of waste management, perfectly distinguishes between municipal and industrial waste and hazardous waste.

EU 3	The student does not know the processes of utilization logistics, legal and organizational conditions in this field.	Student knows basic processes of utilization logistics and legal and organizational conditions but is not able to order them in a proper way.	Student knows basic processes of waste disposal logistics and legal and organizational conditions, can organize them in a correct way, but is not familiar with their specificity for different types of waste.	The student is familiar with complex processes of utilization logistics and legal and organizational conditions, is able to organize them in a proper way, including procedures for handling different types of waste.
EU 4	The student is not able to indicate the benefits resulting from the use of waste disposal logistics.	The student is able to list a few benefits from the use of waste logistics, but is unable to give any concrete example.	Student knows the benefits of waste logistics, can give examples, but can not relate them to the functioning of companies in the competitive market conditions.	The student is able to broadly discuss the benefits of on the practical application of waste logistics processes, taking them into account in the functioning of modern companies and other business entities.

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

Information where presentation of classes, instruction, subjects of seminars can be found, etc. – via internet, during classes and in teacher’s room

Information on the place where the classes take place – class rooms of Technical University of Czestochowa main building

Information on the date of classes (day of the week/hour) – being changed periodically

Information on consultation hours (hours + place) – being changed periodically