LECTURE

- **L1** Outline of the development of composite materials, basic concepts and definitions.
- **L2** Components and their characteristics.
- **L3** Basics of designing composites reinforced with particles, continuous and short fibers.
- **L4** Types of interfaces between components, their role and test methods.
- **L5** Technologies for the production of polymer, metal and ceramic matrix composites.
- **L6** Selected structural aspects of composites and their influence on the properties of the final elements.
- **L7** Forecasts of the directions of development of composites (taking into account economic and ecological aspects).
- **L8** Test.

LABORATORY

- **Lab1** Composite density and component volumetric fractions.
- **Lab2** Analysis of selected reinforcement materials.
- **Lab3** Designing composites with a variable volume fraction of the reinforcing phase.
- **Lab4** Structural analyzes of selected composites.
- **Lab5** Investigation of selected properties of composites.
- **Lab6** Test.

BASIC REFERENCES

1. Hyla I.: Elementy mechaniki kompozytów, Politechnika Śląska, Gliwice, 1995.
2. Nowicki J: Materiały kompozytowe, Wyd. Pol. Łódzkiej, 1993 r.
3. Konsztowicz K.: Kompozyty wzmacniane włóknami. Podstawy technologii, Skrypt AGH, Nr 870, Kraków 1983 r.
4. Śleziona J.: Podstawy technologii kompozytów, Wyd. Pol. Śląskiej, Gliwice 1998 r.
5. Boczkowski A., Kapuściński J., Puciłowski K., Wojciechowski S.: Kompozyty, Wyd. Pol. Warszawskiej, Warszawa 2000 r.
6. Leda H.: Kompozyty polimerowe z włóknami ciągłymi, Wyd. Pol. Poznańskiej, Poznańska 2000 r.

7. Wilczyński A.P.: Polimerowe kompozyty włókniste, WNT, Warszawa 1996 r.
8. Kapuściński J., Puciłowski K., Wojciechowski S.: Kompozyty: podstawy projektowania i wytwarzania, Oficyna Wydaw. Politechniki Warszawskiej, Warszawa, 1993 r.
9. Boczkowska A.: Kompozyty, Oficyna Wydaw. Politechniki Warszawskiej, Warszawa, 2003 r.
10. Koszkul J.: Polipropylen i jego kompozyty, Wyd. Politechniki Częstochowskiej, Częstochowa, 1997 r.
11. Konopka Z.: Metalowe kompozyty odlewane, Wyd. Politechniki Częstochowskiej, Częstochowa, 2011 r.

LEARNING OUTCOMES

› **EU1** The student has mastered the theoretical knowledge of composites.
› **EU2** The student is able to prepare a report on the course of the exercise as well as present and discuss the results of their own activities.

TEACHING TOOLS

› Lecture with the use of audiovisual aids.
› Laboratory - examples of finished products and semi - finished products manufactured using various techniques.
› Exercise stands equipped with apparatus and tools for testing properties and structure.

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

› **F1**. Assessment of the implementation of tasks included in the study program.
› **F2**. Assessment of the mastery of the teaching material being the subject of laboratory tasks - final test.

P1. Assessment of the mastery of the teaching material within the lecture - final test.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures	30	1,2

Seminar		
Classes		
Laboratory	30	1,2
Project		
Test		
Exam		
Total contact hours	60	2,4
Student's own work		
Getting acquainted with the indicated literature	5	0,2
Preparation for seminar		0
Preparation for classes		0
Preparation for lab	6	0,24
Project preparation		0
Consultation	2	0,08
Preparation for the test	2	0,08
Total student's own work	**15**	**0,6**
Total number of hours/ ECTS points for the course	**75**	**3,0**

ADDITIONAL INFORMATION

Timetable of classes	https://wip.pcz.pl/dla-studentow/plan-zajec/studia-stacjonarne
Information about the consultation (time + place)	https://wip.pcz.pl/dla-studentow/konsultacje-dla-studentow

MATRIX OF LEARNING OUTCOMES REALISATION

Learning outcome	**Reference of given outcome to outcomes defined for whole program**	**Course objectives**	**Course content**	**Ways of assessment**
EU 1	K_W04, K_U03,	C1-C2	L1 - L8	P1
EU 2	K_U03, K_K02,	C1-C2	Lab1 - Lab6	F1, F2

FORM OF ASSESSMENT - DETAILS

EU1 The student has mastered the knowledge of composite materials.

- 2,0 The student has not mastered the basic knowledge of composites.
- 3,0 The student has mastered the knowledge of composites sufficiently.
- 3,5 The student has mastered the knowledge of composites sufficiently plus.
- 4,0 The student has mastered the knowledge of composites to a good degree.
- 4,5 The student has mastered the knowledge of composites to a good plus degree.
- 5,0 The student has mastered the knowledge of the material included in the curriculum very well, independently acquires and extends knowledge using various sources.

EU2 The student is able to prepare a report on the course of the exercise as well as present and discuss the results of their own activities.

- 2,0 The student is not able to prepare a report, is not able to present the results of his research.
- 3,0 The student is able to sufficiently prepare a report on the course of the exercise and effectively present and discuss the results of their own activities.
- 3,5 The student is able to sufficiently plus prepare a report on the course of the exercise and present and discuss the results of their own activities.
- 4,0 The student is able to prepare a good report on the course of the exercises and present and discuss the results of their own activities.
- 4,5 The student is able to prepare a report on the course of the exercises and present and discuss the results of their own activities.
- 5,0 The student is able to very well make a report on the implementation of exercises and effectively present and discuss the results of his own activities.

Polish course name	**CENTRA LOGISTYCZNE**
English course name	**LOGISTICS CENTRES**
Course code	**WIP-MDL-D1-LC-04**
Field of study	**Materials design and logistics**
Level of qualification	**First degree**
Form of study	**Full-time**
Semester	**4**
Number of ECTS points	**2**
Ways of assessment	**Exam**

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15		15		

TEACHERS:

Dr inż. Monika Kozerska.

COURSE OBJECTIVES:

› **C1** Students should be familiarized with the main assumptions and the main problems related to the operation of logistics centers.

› **C2** Acquisition of specialised knowledge and expertise in the field of organisation and operation of logistics centers.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Student has basic knowledge in the field of corporate logistics.
2. Student can represent the main sources of financing for the activities of the company.
3. Student can list and explain the steps of the logistical process.

COURSE CONTENT

LECTURE

› **L1, L2** Logistics Centers - Introduction to the topic, overview of the definition.

› **L3, L4** Object and functional area of logistics centres.

› **L5** Sources of financing for the construction and development of centres in Poland.
› **L6** The public-private partnership formula as a source of financing for the construction and development of logistics centres in Poland.
› **L7, L8** The role of the logistics centre in the coordination and consolidation of transport flows.
› **L9, L10** Explanation of multimodal and intermodal transport - differences.
› **L11** Logistics centres are a driving force for the development of multimodal transport.
› **L12, L13** Possibilities of developing inland ports in Poland as logistics centers.
› **L14, L15** Logistics centers worldwide.

CLASSES

› **C1 - C4** The nature and role of logistics centres in large supply chains.
› **C5 - C8** Development trends in logistics centres**.**
› **C9 - C14** Development strategies of logistics centres based on examples.
› **C15** Knowledge check.

BASIC REFERENCES

1. Logistyka, Praca zbiorowa pod red. D. Kisperska-Moroń i S. Krzyżaniaka. Wyd. Instytut Logistyki i Magazynowania, Poznań 2009 r.
2. Skowron-Grabowska B., Centra logistyczne w łańcuchach dostaw, Wyd. PWE, Warszawa 2010 r.
3. Ciesielski M. (red.), Instrumenty zarządzania łańcuchami dostaw. PWE, Warszawa 2009 r
4. Biesok G., Logistyka usług, Wyd. CeDeWu Sp. z o.o, Warszawa 2013 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. Markusik S., Infrastruktura logistyczna w transporcie tom 1 i tom 2, Wyd. Politechniki Śląskiej 2011 r.
2. Rydzkowski Wł. (red.), Usługi logistyczne, Wyd. Biblioteka Logistyka, Poznań 2012 r.
3. Kozerska, M., Jakość usług logistycznych zewnętrznych usługodawców i ich klientów w zintegrowanym łańcuchu dostaw, Wyd. Politechniki Częstochowskiej, Częstochowa 2019 r.

4. Kozerska M., Najważniejsze cetra dystrybucji w kraju i za granicą, Logistyka dystrybucji (red.) Nowakowska-Grunt Joanna, Starostka-Patyk Marta, Wydawnictwa Komunikacji i Łączności 2017 r.
5. Kozerska M., Szczupak L., The Influence of Logistics Centers on the Region Development on the Example of Bełchatów District, Zeszyty Naukowe Politechniki Częstochowskiej. Zarządzanie 2017 r.
6. Fechner I., Centra logistyczne Cel - Realizacja -Przyszłość, Wyd. Biblioteka Logistyka, ILiM, Poznań, 2004 r.

LEARNING OUTCOMES

› **EU1** Student knows the basic concepts: logistics centers, distribution centers.
› **EU2** Student knows the classification of logistics centers according to various criteria.
› **EU3** Student can define the Formula of Public - Private Partnership and list the sources of financing for the construction and development of centers in Poland.

TEACHING TOOLS

› Multimedia presentations.
› The study of literature.
› Case studies/discussion.
› E-learning platform.

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

› **F1**. Participation of students in discussions.
› **F2.** Solving case studies.
› **P1.** Assessment of thematic presentations.
› **P2.** Assessment of the implementation of tasks included in the curriculum - exam.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures	15	0,6
Seminar		

Classes	15	0,6
Laboratory		
Project		
Test		
Exam	3	0,12
Total contact hours	33	1,32
Student's own work		
Getting acquainted with the indicated literature	5	0,2
Preparation for seminar		0
Preparation for classes	5	0,2
Preparation for lab		0
Project preparation		0
Consultation	2	0,08
Preparation for the exam	5	0,2
Total student's own work	17	0,68
Total number of hours/ ECTS points for the course	**50**	**2,0**

ADDITIONAL INFORMATION

Timetable of classes	https://wip.pcz.pl/dla-studentow/plan-zajec/studia-stacjonarne
Information about the consultation (time + place)	https://wip.pcz.pl/dla-studentow/konsultacje-dla-studentow

MATRIX OF LEARNING OUTCOMES REALISATION

Learning outcome	**Reference of given outcome to outcomes defined for whole program**	**Course objectives**	**Course content**	**Ways of assessment**
EU 1	K_W01, K_W02, K_W06, K_W07, K_W08, K_W09,	C1, C2	L1 - L2, C1 - C12	F1, F2, P1

EU 2	K_W01, K_W02, K_W06, K_W07, K_W08, K_W09, K_K01,	C1, C2	L1 - L9, C3 - C6	F1,F2, P1, P2
EU 3	K_W01, K_W02, K_W06, K_W07, K_W08, K_W09, K_U07, K_U08, K_K01, K_K02, K_K03, K_K04,	C2	L1 - L15, C3 - C15	F1, F2, P1, P2

FORM OF ASSESSMENT - DETAILS

EU1 Student knows the basic concepts: logistics centers, distribution centers.

- 2,0 Student does not know the basic concepts of the subject matter.
- 3,0 Student partially knows the basic concepts of the subject.
- 3,5 Student almost knows the basic concepts of the subject.
- 4,0 Student knows the concepts of the subject well.
- 4,5 Student has a very good understanding of the subject matter.
- 5,0 Student knows the basic concepts of the subject very well.

EU2 Student knows the classification of logistics centers according to various criteria.

- 2,0 Student does not know the rules of classification of logistics centers.
- 3,0 Student partially knows the rules of classification of logistics centers.
- 3,5 Student almost knows the general rules of classification of logistics centers.
- 4,0 Student knows the general rules of classification of logistics centers well.
- 4,5 Student knows almost very well the general rules of classification of logistics centers.
- 5,0 Student knows the general rules of classification of logistics centers very well.

EU 3 Student can define the Formula of Public-Private Partnership and list the sources of financing for the construction and development of centers in Poland.

- 2,0 Student is not able to identify the concept of Public - Private.
- 3,0 Student is able to partially identify the notions of Public - Private.
- 3,5 Student is almost able to identify the concepts of Public - Private.
- 4,0 Student is able to define well the concept of Public - Private.

› 4,5 Student almost very well define the concept of Public - Private.

› 5,0 Student is very good at defining the concept of Public - Private. He knows the rules for drawing up applications in this area.

Polish course name	**KOSZTY LOGISTYKI PRZEDSIĘBIORSTW**
English course name	**ENTERPRISE LOGISTICS COSTS**
Course code	**WIP-MDL-D1-ELC-04**
Field of study	**Materials design and logistics**
Level of qualification	**First degree**
Form of study	**Full-time**
Semester	**4**
Number of ECTS points	**3**
Ways of assessment	**Test**

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15		15		

TEACHERS:

Dr hab. inż. Beata Ślusarczyk, prof. PCz.,
Dr Katarzyna Grondys.

COURSE OBJECTIVES:

› **C1** Identification of logistics costs in the enterprise.
› **C2** Analysis of the level and structure of logistics costs in the enterprise.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Basic knowledge of logistics processes.
2. Ability to use basic computer programs such as text editor, spreadsheet.
3. Ability to analyze economic processes.

COURSE CONTENT

LECTURE

› **L1 - L4** The essence and concepts of logistics costs. Classification cross-sections of logistics costs.
› **L5 - L8** Model approach to logistics costs - transport and inventory costs.

› **L9 - L11** Model approach to logistics costs - costs of IT processes. Logistics cost interdependence and partial cost conflict. Global logistics costs.
› **L12, L13** Logistics costs in the company's accounting system.
› **L14, L15** Basic cost indicators of the evaluation of logistic processes in the enterprise. Logistic customer service costs.

CLASSES

› **C1 - C3** Specification of cost calculation in transport activity.
› **C4 - C6** Calculation of transport order costs.
› **C7, C8** Minimization of transport costs in the logistics system.
› **C9 - C11** Calculation and optimization of warehouse and warehouse space costs. Inventory costing.
› **C12 - C14** Calculation of the global costs of the company's logistics. Application of investment effectiveness assessment methods (NPV, IRR) to verify the decision on the purchase of means of transport by an enterprise.
› **C15** Test

BASIC REFERENCES

1. Skoczylas K., Koszty i controlling logistyki w przedsiębiorstwie, Oficyna Wydaw. Politechniki Rzeszowskiej, Rzeszów 2010 r.
2. Bentkowska-Senator K., Kordel Z., Waśkiewicz J., Polski transport samochodowy: rynek, koszty, cena, Wydaw. Instytutu Transportu Samochodowego, Warszawa 2012 r.
3. Ślusarczyk B., Problemy ewidencjonowania i pomiaru kosztów logistyki w przedsiębiorstwach, Przegląd Organizacji, nr 10 (897), 2014 r., s. 37-43.
4. Ślusarczyk B., Kot S., Analiza kosztów logistyki w MSP, Gospodarka Materiałowa i Logistyka, nr 6 2013 r., s. 7-11.

SUPPLEMENTARY REFERENCE MATERIALS

1. Ślusarczyk B., Costs aspects of creating 3PL logistic operators' offers, Zeszyty Naukowe Politechniki Śląskiej Organizacja i Zarządzanie, nr 116, 2018 r., s. 163-176.
2. Grondys K., Brzeziński S., Optimization of Gross Margin in Outsourcing of Management of Inventory of Spare Parts of Production Equipment, Applied Mechanics and Materials Vol.708/2015.

LEARNING OUTCOMES

› **EU1** Student is able to identify the costs of logistics in the enterprise and determine the place where they arise.
› **EU2** The student is able to estimate the costs of logistics processes and global logistics costs.
› **EU3** The student knows the specificity of logistics costs in the company's accounting system.

TEACHING TOOLS

› Multimedia presentations.
› E-learning platform.
› Sets of calculation tasks.

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

› **F1**. Assessment of tasks and activities optionally performed in e-learning.
› **P1**. Assessment of the teaching material from the exercises - test.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures	15	0,6
Seminar		
Classes	15	0,6
Laboratory		
Project		
Test	3	0,12
Exam		
Total contact hours	33	1,32
Student's own work		
Getting acquainted with the indicated literature	15	0,6
Preparation for seminar		
Preparation for classes	15	0,6
Preparation for lab		

Project preparation		
Consultation	3	0,12
Preparation for the test	9	0,36
Total student's own work	42	1,68
Total number of hours/ ECTS points for the course	**75**	**3,0**

ADDITIONAL INFORMATION

Timetable of classes	USOS
Information about the consultation (time + place)	https://wz.pcz.pl/katedra-logistyki

MATRIX OF LEARNING OUTCOMES REALISATION

Learning outcome	**Reference of given outcome to outcomes defined for whole program**	**Course objectives**	**Course content**	**Ways of assessment**
EU 1	K_W02, K_W06, K_W07, K_U07, K_U09, K_K02, K_K03,	C1	L1 - L7, C1 - C6, C15	F1, P1
EU 2	K_W02, K_W06, K_W07, K_U07, K_U09, K_K02, K_K03,	C2	L8 - L11, C7 - C11, C15	F1, P1
EU 3	K_W02, K_W06, K_W07, K_U07, K_U09, K_K02, K_K03,	C2	L12 - L15, C12 -C15	F1, P1

FORM OF ASSESSMENT - DETAILS

EU1 Student is able to identify the costs of logistics in the enterprise and determine the place where they arise.

- 2,0 The student is not able to identify logistics costs and their places of origin.
- 3,0 The student partially identifies the costs of logistics and the places where they arise.
- 3,5 The student can almost identify the costs of logistics and their places of origin.
- 4,0 The student is able to identify logistics costs well and where they arise.
- 4,5 The student identifies logistics costs and their places of origin almost very well.
- 5,0 The student very well identifies the costs of logistics and their place of origin and is able to carry out independent cost analyses.

EU2 The student is able to estimate the costs of logistics processes and global logistics costs.

- 2,0 The student is not able to define how the costs of logistics processes are estimated and what is their role in the global costs of logistics.
- 3,0 The student is able to partially define how the costs of logistics processes are estimated and what is their role in the global costs of logistics.
- 3,5 The student can almost define how the costs of logistics processes are estimated and what is their role in the global costs of logistics.
- 4,0 The student is able to define well how the costs of logistics processes are estimated and what is their role in the global costs of logistics, but does not interpret the obtained results.
- 4,5 The student can almost very well define how the costs of logistics processes are estimated and what is their role in the global costs of logistics and interpret the results obtained.
- 5,0 The student is very well able to define how the costs of logistics processes are estimated and what is their role in global logistics costs, and interprets the obtained results and can predict changes in the calculated result caused by specific managerial decisions.

EU 3 The student knows the specificity of logistics costs in the company's accounting system.

- 2,0 The student is not able to characterize the specificity of logistics costs in the company's accounting system.
- 3,0 The student is able to partially determine the specificity of logistics costs in the company's accounting system.

› 3,5 The student can almost determine the specificity of logistics costs in the company's accounting system.
› 4,0 The student is able to determine the specificity of logistics costs in the company's accounting system.
› 4,5 The student can almost very well determine the specificity of logistics costs in the company's accounting system.
› 5,0 The student very well define the specificity of logistics costs in the company's accounting system, distinguishes the possibilities of recording logistics costs.