

Załącznik 10

Opisy zajęć w postaci sylabusów/kart przedmiotów
dla studiów stacjonarnych pierwszego stopnia
na kierunku **Materials Design and Logistics**
prowadzonego w języku angielskim

Polish course name	SZKOLENIE DOTYCZĄCE BEZPIECZNYCH I HIGIENICZNYCH WARUNKÓW KSZTAŁCENIA
English course name	TRAINING ON SAFE AND HYGIENIC EDUCATION CONDITIONS
Course code	WIP-MDL-D1-TSAHE-01
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	1
Number of ECTS points	0
Ways of assessment	Credit

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
4				

TEACHERS:

Dr inż. Teresa Bajor.

COURSE OBJECTIVES:

- › **C1** Transfer of knowledge and rules concerning health and safety at work that apply to students during their stay at the university.
- › **C2** Acquainting students with a selected group of threats and the principles of reporting an accident.
- › **C3** Reminding students of issues related to giving first aid.
- › **C4** Reminding students of information on fire protection, including evacuation rules.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Basic knowledge of occupational health and safety.
2. Ability to use literature sources and internet resources.

COURSE CONTENT

LECTURE

- › **L1** Basic concepts of health and safety. Legal regulations in the field of occupational health and safety and fire protection, the rules of moving and staying on the premises of the University. Health and safety rules related to the operation of technical devices and machines, the specificity of working at a computer.
- › **L2** Accident and health hazards at the University. Dangerous, harmful and burdensome factors. Order and cleanliness in the place of study.
- › **L3** Preventive medical care. First aid in the event of an accident. The most common injuries and what to do in the event of their occurrence. Securing the scene of the accident.
- › **L4** Fire protection. The causes of fires. Basic principles of fire protection. Rules for dealing with waste at the University - municipal and hazardous waste.

BASIC REFERENCES

1. Current laws, regulations and standards relating to higher education and science.
2. Current regulations and standards on how to ensure safe and hygienic working and learning conditions in the university.
3. Current laws, regulations and standards relating to provision for accidents or occupational diseases arising in special circumstances.
4. Current laws, regulations and standards relating to fire protection.
5. Current laws, regulations and standards relating to health and safety at work at workplaces equipped with screen monitors.
6. Orders of the Rector of PCz.

SUPPLEMENTARY REFERENCE MATERIALS

1. Orders of the Chancellor of the PCz.

LEARNING OUTCOMES

- › **EU1** Student has basic theoretical knowledge in the regulations, health and safety rules and waste management in force while at the university.

- › **EU2** Student knows the rules of first aid and the rules of evacuation in the event of a fire.
- › **EU3** Student knows the rules of proper behavior in a life and health threatening situation.

TEACHING TOOLS

- › Multimedia presentations.
- › CUT e-learning platform.

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

P1. Final test.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures	4	0
Seminar		
Classes		
Laboratory		
Project		
Test		
Exam		
Total contact hours	4	0
Student's own work		
Getting acquainted with the indicated literature		
Preparation for seminar		
Preparation for classes		
Preparation for lab		
Project preparation		
Consultation	2	0
Preparation for the exam		
Total student's own work	2	0

Total number of hours/ ECTS points for the course	6	0
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ADDITIONAL INFORMATION

Timetable of classes	https://usosweb.pcz.pl/
Information about the consultation (time + place)	https://usosweb.pcz.pl/

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_W08, K_K01,	C1, C2	L1, L4	P1
EU 2	K_W08, K_K01,	C2, C3	L3	P1
EU 3	K_W08, K_K01,	C2, C4	L2, L4	P1

FORM OF ASSESSMENT - DETAILS

EU1 The student has basic knowledge of the regulations, health and safety rules and waste management in force while at the university.

- › nzal The student did not participate in the training and did not acquire basic knowledge of the provisions and principles of health and safety as well as waste management in force while at the university.
- › zal The student participated in the training and acquired basic knowledge of the provisions and principles of health and safety as well as waste management in force during his stay at the university.

EU2 The student knows the rules of first aid and the rules of evacuation in case of fire.

- › nzal The student did not participate in the training, does not know the rules of first aid and the rules of evacuation in the event of a fire.

- › zal The student participated in the training and knows the rules of first aid and the rules of evacuation in the event of a fire.

EU3 The student knows the rules of proper behavior in a life and health threatening situation.

- › nzal The student has not participated in the training and does not know the rules of proper behavior in a life and health threatening situation.
- › zal The student participated in the training and knows the rules of proper behavior in a life and health threatening situation.

Polish course name	LOGISTYKA ZAOPATRZENIA
English course name	SUPPLY LOGISTICS
Course code	WIP-MDL-D1-SL-01
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	1
Number of ECTS points	2
Ways of assessment	Cerdit

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15		15		

TEACHERS:

Dr hab. inż. Joanna Nowakowska-Grunt, prof. PCz.,

Dr Mateusz Chłąd,

Dr Judyta Kabus.

COURSE OBJECTIVES:

- › **C1** Provide students with knowledge of physical and information flows in the field of material and information supply in the area of procurement.
- › **C2** Introducing the students to Acquisition by students of practical skills in the field of using modern systems for replenishing supplies.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Basic knowledge of management and logistics.
2. Ability to work independently and in a group.
3. Ability to use literature sources and internet resources.

COURSE CONTENT

LECTURE

- › **L1, L2** Logistic systems in the economy and in the enterprise. Supply functions.

- › **L3** Supply logistics as an element of the company's logistics system and supply chain.
- › **L4, L5** The need and methods of material needs planning.
- › **L6** Selection of sources of supply.
- › **L7** Selection of a supplier and forms of cooperation with suppliers.
- › **L8** Components of procurement costs.
- › **L9 - L11** Tasks and types of warehouses. Storage systems and technology. Planning and optimization of material flows in the warehouse. Warehouse transport systems and techniques (automatic identification, storage and transport devices).
- › **L12, L13** Planning of production processes. Control of production and flow of materials and finished products, goals and methods.
- › **L14, L15** IT technologies in supply logistics GS1, MRP, ERP, EDI. Integration of supply and production logistics.

CLASSES

- › **C1, C2** Introduction. Inventories and their categories in manufacturing, trading and distribution enterprises.
- › **C3, C4** Defining the consumption rates. Inventory stocks.
- › **C5, C6** Determining the size of delivery, taking into account transport time and inventory in transport.
- › **C7, C8** Inventory control methods: fixed point of order, periodical inspection method. Determining the optimal size of the purchase batch using the EOQ method.
- › **C9, C10** Inventory classification using ABC and XYZ techniques.
- › **C11, C12** Preparation of a specification of a simple industrial product.
- › **C13, C14** Determining the demand for raw materials and materials based on the product specification and production plan.
- › **C15** Planning the flow of materials and goods.

BASIC REFERENCES

1. Lysons, K. 2004. Zakupy zaopatrzeniowe. PWE Warszawa.
2. Krzyżaniak S. 2005. Podstawy zarządzania zapasami w przykładach, Biblioteka Logistyka, Poznań.

SUPPLEMENTARY REFERENCE MATERIALS

1. Fertsch, M. 2003. Logistyka produkcji. Instytut Logistyki i Magazynowania, Poznań.
2. Grzybowska K. 2009. Gospodarka zapasami i magazynem, Cz. 1, Zapasy, Wyd. Difin, Warszawa.

LEARNING OUTCOMES

EU1 The student has knowledge of the basic categories in the field of supply logistics.

EU2 Student can distinguish and estimate the procurement needs of the enterprise.

TEACHING TOOLS

- › Multimedia presentations.
- › Calculation exercises.
- › Calculator.

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

F1. Assessment of the implementation of tasks included in the curriculum.

F2. Assessment of the mastery of the teaching material being the subject of exercise tasks - final test.

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

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	2	0,08
Exam		

Total contact hours	32	1,28
Student's own work		
Getting acquainted with the indicated literature	6	0,24
Preparation for seminar		
Preparation for classes	4	0,16
Preparation for lab		
Project preparation		
Consultation	2	0,08
Preparation for the test	6	0,24
Total student's own work	18	0,72
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_W02, K_W05, K_W06, K_U01, K_U02, K_U05, K_K01, K_K02,	C1	L1 - L15	P1
EU 2	K_W02, K_W05, K_W06, K_U01, K_U02, K_U05, K_K01, K_K02,	C2	C1 - C15	F1, F2

FORM OF ASSESSMENT - DETAILS

EU1 The student can distinguish and estimate the supply needs of the enterprise.

- › 2,0 The student does not know the basic rules of stock and supply warehouse management.
- › 3,0 The student partially knows the basic rules of stock and supply warehouse management.
- › 3,5 The student almost knows the basic rules of stock and supply warehouse management.
- › 4,0 The student knows well about inventory and supply warehouse management.
- › 4,5 Student almost very well dealing with inventory management and sourcing warehouse.
- › 5,0 The student knows very well the basic rules of stock and supply warehouse management.

EU2 The student has knowledge of the basic categories in the field of supply logistics.

- › 2,0 The student is not able to define and name the basic categories of supply logistics.
- › 3,0 Student is able to partially define and name the basic categories of supply logistics.
- › 3,5 Student is able to define and name the basic categories of supply logistics.
- › 4,0 The student is able to define and name the basic categories of supply logistics well.
- › 4,5 The student is almost very good at defining and naming the basic categories of supply logistics.
- › 5,0 Student define very well and name the basic categories of supply logistics.

Polish course name	BEZPIECZEŃSTWO I HIGIENA PRACY
English course name	OCCUPATIONAL HEALTH AND SAFETY
Course code	WIP-MDL-D1-OHAS-01
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	1
Number of ECTS points	1
Ways of assessment	Test

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15				

TEACHERS:

Dr inż. Marlena Krakowiak.

COURSE OBJECTIVES:

- › **C1** Providing students with basic knowledge in the field of occupational health and safety.
- › **C2** Making students aware of the importance of regulations and principles of occupational health and safety and the consequences of non-compliance with them.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Basic knowledge of physics, biology and chemistry.
2. Ability to use literature sources with particular emphasis on legal documents.

COURSE CONTENT

LECTURE

- › **L1, L2** Basic issues related to OHS, legal aspects of OHS in national and international regulations.

- › **L3, L4** Hazards in the workplace – harmful, nuisance and hazardous factors.
- › **L5, L6** Consequences of non-compliance with health and safety regulations – accidents at work and occupational diseases.
- › **L7** Means of collective and individual protection.
- › **L8** Particularly hazardous work.
- › **L9, L10** Storage and transport of hazardous substances and materials.
- › **L11, L12** Occupational risk assessment.
- › **L13** Prophylaxis of occupational health protection – training, health examinations.
- › **L14, L15** Basic information on: emergency first-aid procedures, evacuation, fire protection.

BASIC REFERENCES

1. Rączkowski B., BHP w praktyce, Wyd. ODDK, Gdańsk 2010 r.
2. Koradecka D., Bezpieczeństwo i higiena pracy, Wyd. AGH, Kraków 2010 r.
3. Chojnicki J., Jarosiewicz G., ABC BHP. Informator dla pracodawców, Wyd. PIP GIP, Warszawa 2016 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. Łabanowski W., Bezpieczeństwo użytkowania maszyn. Poradnik dla pracodawców, Wyd. PIP GIP, Warszawa 2012 r.
2. Grausz T.W., Zagrożenia czynnikami chemicznymi w miejscu pracy, Wyd. PIP GIP, Warszawa 2013 r.
3. Krakowiak M., Suszek E., Elektryczność statyczna a bezpieczeństwo pracy, Inżynieria Produkcji. Bezpieczeństwo jako determinanta doskonalenia systemu zarządzania organizacjami, Seria Monografie nr 66, Częstochowa 2016 r., s. 67-79.
4. Krakowiak M., Warunki sprawnej i skutecznej ewakuacji, Analiza zagrożeń podstawą funkcjonowania współczesnej organizacji (red.) Bajor Teresa, Berski Szymon, Seria Monografie nr 71, Częstochowa 2017 r., s. 94-103.

5. Krakowiak M., Bajor T. (red.), Wybrane aspekty bezpieczeństwa funkcjonowania współczesnych organizacji, Monografie nr 81, Częstochowa 2018 r.

LEARNING OUTCOMES

- › **EU1** Student knows and understands the basic concepts of health and safety and risk assessment.
- › **EU2** Student knows the basic hazards in the work environment and is aware of the consequences of non-compliance with health and safety regulations and rules.

TEACHING TOOLS

- › Multimedia presentations.

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

- › **F1.** Assessment of active participation in conversatory lectures.
- › **P1.** Assessment of the mastery of the teaching material within the lectures – a final test.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures	15	0,60
Seminar		
Classes		
Laboratory		
Project		
Test		
Exam		
Total contact hours	15	0,60
Student's own work		
Getting acquainted with the indicated literature	6	0,24
Preparation for seminar		
Preparation for classes		

Preparation for lab		
Project preparation		
Consultation	2	0,08
Preparation for the test	2	0,08
Total student's own work	10	0,40
Total number of hours/ ECTS points for the course	25	1,0

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_W08, K_K01,	C1, C2	L1 - L15	F1, P1
EU 2	K_W08, K_K01,	C1, C2	L1 - L15	F1, P1

FORM OF ASSESSMENT - DETAILS

EU1 Student knows and understands the basic concepts of health and safety and risk assessment.

- › 2,0 Student does not know and understand the basic concepts of health and safety and risk assessment.
- › 3,0 Student partially knows and understands the basic concepts of health and safety and risk assessment.
- › 3,5 Student knows and understands most of the basic concepts of health and safety and risk assessment.
- › 4,0 Student knows and understands the basic concepts of health and safety and risk assessment well.

- › 4,5 Student knows and understands the basic concepts of health and safety and risk assessment almost very well.
- › 5,0 Student knows and understands the basic concepts of health and safety and risk assessment very well.

EU2 Student knows the basic hazards in the work environment and is aware of the consequences of non-compliance with health and safety regulations and rules.

- › 2,0 Student does not know the basic hazards in the work environment and is not aware of the consequences of non-compliance with health and safety regulations and rules.
- › 3,0 Student partially knows the basic hazards in the work environment and is aware of the consequences of non-compliance with health and safety regulations and rules.
- › 3,5 Student knows the most of basic hazards in the work environment and is aware of some consequences of non-compliance with health and safety regulations and rules.
- › 4,0 Student knows the basic hazards in the work environment well and is aware of the main consequences of non-compliance with health and safety regulations and rules.
- › 4,5 Student knows the basic hazards in the work environment almost very well and is aware of most of the consequences of non-compliance with health and safety regulations and rules.
- › 5,0 Student knows the basic hazards in the work environment very well and is aware of the complex effects of non-compliance with health and safety regulations and rules.

Polish course name	PODSTAWY INFORMATYKI
English course name	BASICS OF COMPUTER SCIENCE
Course code	WIP-MDL-D1-BOCS-01
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	1
Number of ECTS points	2
Ways of assessment	Test

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15			15	

TEACHERS:

Dr inż. Marcin Kwapisz.

COURSE OBJECTIVES:

- › **C1** Providing students with knowledge of the basics of computer science.
- › **C2** To acquaint students with the structure and functioning of a personal computer and basic application software.
- › **C3** Acquisition by students of the correct use of the programs contained in the so-called office packages and the basics of computer graphics processing.
- › **C4** Provide students with knowledge of the basics of structured programming.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Basic knowledge of the basics of computer operation.
2. Ability to logically reason and build logical tasks.
3. Ability to perform mathematical operations to solve basic tasks.
4. Ability to use literature sources and internet resources.
5. Ability to work independently and in a group.
6. Acquisition by students of the ability to correctly use the programs contained in the so-called office packages and the basics of computer graphics processing.

COURSE CONTENT

LECTURE

- › **L1** Introduction - basic concepts related to computer science, history of computer science.
- › **L2** Computer structure.
- › **L3** Operating systems.
- › **L4** Computer networks.
- › **L5, L6** Office packages - overview and characteristics of basic functions.
- › **L7, L8** Introduction to computer graphics - raster graphics, vector graphics, applications.
- › **L9** Databases - characteristics of basic types of databases.
- › **L10** Introduction to high-level language programming, C ++ source code, compilers.
- › **L11, L12** Constants, variables, data types in C language, instructions that control program execution in C ++.
- › **L13** Complex variables, user functions.
- › **L14, L15** Selected search and sorting algorithms, selected numerical algorithms.

LABORATORY

- › **Lab1, Lab2** Introduction basic concepts related to computer work, computer structure, directory structure, computer networks.
- › **Lab3 - Lab6** Office packages - overview and characteristics of basic functions, working with spreadsheets.
- › **Lab7, Lab8** Introduction to computer graphics, raster graphics and vector practical application.
- › **Lab9, Lab10** Databases - practical application examples.
- › **Lab11 - Lab15** Principles of creating structural programs – examples.

BASIC REFERENCES

1. D.E. Knuth: Sztuka programowania – tomy1-3, Wydawnictwa Naukowo-Techniczne 2006 r.
2. P. Wróblewski: Algorytmy, struktury danych i techniki programowania, Wydawnictwo Helion 2015 r.
3. Człowiek vs Komputer, Wydawnictwo Naukowe PWN 2019 r.

4. R. Kawa, J. Lembas, Wstęp do informatyki, Wydawnictwo Naukowe PWN 2017 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. Internet resources.

LEARNING OUTCOMES

- › **EU1** The student is able to characterize the basic concepts related to computer science.
- › **EU2** The student knows the basics of working with an office suite.
- › **EU3** The student knows the basics of creating and editing computer graphics.
- › **EU4** The student knows and is able to create algorithms and programs solving mathematical or logical problems.

TEACHING TOOLS

- › Lecture with the use of audiovisual means.
- › Laboratory - desktop computers.
- › Libre Office, Gimp, Inkscape, CodeBlocks computer software.
- › E-learning platform of the Częstochowa University of Technology, or other distance learning tools.

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

- › **F1.** Assessment of the implementation of tasks included in the curriculum.
- › **F2.** Assessment of the mastery of the teaching material being the subject of laboratory tasks - final test.
- › **F3.** Assessment of activity during classes.
- › **P1.** Assessment of the mastery of the teaching material within the lectures - final test.

STUDENT WORKLOAD

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

Classes		
Laboratory	15	0,6
Project		
Test	3	0,12
Exam		
Total contact hours	33	1,32
Student's own work		
Getting acquainted with the indicated literature	2	0,08
Preparation for seminar		
Preparation for classes		
Preparation for lab	8	0,32
Project preparation		
Consultation	2	0,08
Preparation for the test	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_U04,	C1, C2, C3, C4	L1 - L4, Lab1 - Lab15	F1, F2, F3, P1

EU 2	K_W01, K_U04,	C1, C2, C3, C4	L5 - L6, Lab5 - Lab12	F1, F2, F3, P1
EU 3	K_W01, K_U04,	C1, C2, C3, C4	L7 - L9, Lab1 - Lab15	F1, F2, F3, P1
EU 4	K_W01, K_U04,	C1, C2, C3, C4	L10 - L15, Lab1 - Lab15	F1, F2, F3, P1

FORM OF ASSESSMENT - DETAILS

EU1 The student is able to characterize the basic concepts related to computer science.

- › 2,0 The student is not able to list the basic elements of the computer.
- › 3,0 The student is able to list the basic elements of a computer.
- › 3,5 The student is able to list the basic elements of a computer and characterize the structure of the computer.
- › 4,0 The student is able to list the basic elements of a computer, characterize the structure of the computer and operating systems.
- › 4,5 The student is able to list the basic elements of a computer, characterize the structure of a computer, operating systems and a computer network.
- › 5,0 The student is able to characterize very well the basic concepts related to computer science.

EU2 The student knows the basics of working with an office suite.

- › 2,0 The student does not know the basics of working with an office suite.
- › 3,0 The student is able to indicate the appropriate program of the office suite and perform basic editing operations.
- › 3,5 The student is able to select the appropriate program of the office suite, perform basic editing operations and save the file in the indicated format.
- › 4,0 The student is able to select the appropriate program of the office suite, perform basic editing operations, save the file in the specified format and transfer data between the programs of the office suite.
- › 4,5 The student is able to select the appropriate program of the office suite, perform basic editing operations, save the file in the indicated format, transfer data between the programs of the office suite and modify them.
- › 5,0 The student knows the basics of working with an office suite very well.

EU3 Student knows the basics of creating and editing computer graphics.

- › 2,0 The student does not know the basics of creating and editing computer graphics.
- › 3,0 The student knows the basics of creating and editing computer graphics.
- › 3,5 The student knows the basics of creating and editing computer graphics and can distinguish between types of graphics.
- › 4,0 The student knows the basics of creating and editing computer graphics, can distinguish between types of graphics and propose possible changes.
- › 4,5 The student knows the basics of creating and editing computer graphics, can distinguish between types of graphics, suggest possible changes and indicate the appropriate tool.
- › 5,0 The student knows the basics of creating and editing computer graphics, can distinguish between types of graphics, suggest possible changes, indicate the appropriate tool and use it.

EU4 The student knows and is able to create algorithms and programs solving mathematical or logical problems.

- › 2,0 The student does not know the rules of creating algorithms.
- › 3,0 The student knows the rules of creating algorithms.
- › 3,5 The student knows the rules of creating algorithms and is able to determine its course.
- › 4,0 The student knows the rules of creating algorithms and is able to analyze it.
- › 4,5 The student knows the rules of creating algorithms and is able to analyze it and define the required variables.
- › 5,0 The student knows the rules of creating algorithms and is able to analyze and implement it.

Polish course name	PODSTAWY ORGANIZACJI I ZARZĄDZANIA
English course name	BASIS OF ORGANIZATION AND MANAGEMENT
Course code	WIP-MDL-D1-BOOAM-01
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	1
Number of ECTS points	2
Ways of assessment	Test

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15		15		

TEACHERS:

Dr hab. inż. Rafał Prusak, prof. PCz.,

Dr inż. Zbigniew Skuza,

Dr inż. Teresa Bajor.

COURSE OBJECTIVES:

- › **C1** Provide students with knowledge and principles regarding issues related to managing, organizing, supervising people and controlling enterprises.
- › **C2** Learning and understanding by students of various methods and concepts of business management.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Basic knowledge of entrepreneurship.
2. Ability to use literature sources and internet resources.

COURSE CONTENT

LECTURE

- › **L1** Discussion of the topics of lectures.

- › **L2** Organization, the essence of management, resources.
- › **L3** Global, environmental, ethical and social management context.
- › **L4** Managing the goals of the organization and planning.
- › **L5** Strategic management.
- › **L6** Making managerial decisions.
- › **L7** Elements of the organizational structure.
- › **L8** Organization design management.
- › **L9** Managing organizational changes.
- › **L10** Managing human resources.
- › **L11** Managing interpersonal and group processes.
- › **L12** Managing communication in organizations.
- › **L13** Controlling process. Performance, quality and operational management.
- › **L14** Technology and innovation management. Information systems management.
- › **L15** Summary of the lectures.

CLASSES

- › **C1** Acquainting students with the rules of passing the course. Evolution of management practice and theory.
- › **C2** Selected methods of enterprise management.
- › **C3** Planning (essence, dimensions of the planning process, stages, types of plans).
- › **C4** Management tools for planning and decision making.
- › **C5** Techniques for improving the organization.
- › **C6** Motivation (theories, motivators).
- › **C7** Leadership and leadership.
- › **C8** Control in the enterprise.
- › **C9** Budget and business control tools.
- › **C10** Logistics as an instrument of company management.
- › **C11** Managing Cultural Diversity.
- › **C12** Creativity and innovation.
- › **C13** Creation of new businesses.
- › **C14, C15** Summary of the topic of exercises - test.

BASIC REFERENCES

1. R. W. Griffin: Podstawy Organizacji i Zarządzania, Wydawnictwo Naukowe PWN, Warszawa, 2017 r.
2. A. Rogowski: Podstawy organizacji i zarządzania produkcją w przedsiębiorstwie, CeDeWu, Warszawa, 2018 r.
3. A. Czermiński, M. Grzybowski, K. Ficoń: Podstawy organizacji i zarządzania, Wyższa Szkoła Administracji i Biznesu w Gdyni Gdynia 1999 r.
4. K. Karbowski, B. Wyrzykowska: Podstawy teorii organizacji i zarządzania, Wydawnictwo Szkoły Głównej Gospodarstwa Wiejskiego, Warszawa 2009 r.
5. M. Bielski: Podstawy teorii organizacji i zarządzania, Wydawnictwo. C. H. Beck, Warszawa 2002 r.
6. M. Krwawicz: Podstawy organizacji i zarządzania, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2020 r.
7. K. Karbowski: Podstawy teorii organizacji i zarządzania, Wydawnictwo SGGW, Warszawa 2009 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. C. Kolmasiak, R. Prusak, Z. Skuza: Przepływ zasileń informacyjnych w systemie wspomagającym zarządzanie, Logistyka nr 4, 2010 r., str. 69 – 72.
2. Z. Skuza, R. Prusak, C. Kolmasiak: Wybrane aspekty zarządzania produkcją w badanym obiekcie przemysłowym, Logistyka nr 6, 2012 r., str. 258 – 260.
3. Z. Skuza. M. Ogórek: Inżynieria produkcji - wybrane zagadnienia doskonalenia procesów w przedsiębiorstwach, Monografia nr 70, Wydawnictwo Wydziału Inżynierii Produkcji i Technologii Materiałów Politechniki Częstochowskiej.
4. R. Prusak: Kształtowanie struktury kapitału intelektualnego przedsiębiorstwa, Politechnika Częstochowska, Prace Naukowe Wydziału Inżynierii Procesowej, Materiałowej i Fizyki Stosowanej, Seria: Monografie Nr 34, Częstochowa 2013 r.
5. M. Ogórek, T. Bajor: Wybrane zagadnienia dotyczące usprawnienia procesów w przedsiębiorstwie, Redakcja monografii nr 58, Wydawnictwo Wydziału Inżynierii Produkcji i Technologii Materiałów Politechniki Częstochowskiej, Częstochowa, 2016 r.

LEARNING OUTCOMES

- › **EU1** The student has basic knowledge of organization and management in the enterprise.
- › **EU2** The student understands the complexity of management and organization processes and the role of the human factor.

TEACHING TOOLS

- › Lecture with the use of audiovisual means.
- › Classes - solving problem tasks with the help of the teacher.
- › PCz e-learning platform.

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

- › **F1.** Assessment of activity during classes.
- › **F2.** Assessment of self-preparation for classes.
- › **P1.** Assessment of the mastery of the teaching material being the subject of exercises - final 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	2	0,08
Exam		
Total contact hours	32	1,28
Student's own work		
Getting acquainted with the indicated literature	5	0,2
Preparation for seminar		
Preparation for classes	5	0,2

Preparation for lab		
Project preparation		
Consultation	4	0,16
Preparation for the test	4	0,16
Total student's own work	18	0,72
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_W07, K_W08,	C1	L1 - L15	F1
EU 2	K_U07,	C2	C1 - C15	F2 P1

FORM OF ASSESSMENT - DETAILS

EU1 The student has basic knowledge of organization and management in the enterprise.

- › 2,0 The student does not have basic knowledge of organization and management in the enterprise.
- › 3,0 The student partially has basic knowledge of organization and management in the enterprise.
- › 3,5 The student has almost basic knowledge of organization and management in the enterprise.

- › 4,0 The student has a good basic knowledge of organization and management in an enterprise.
- › 4,5 The student has an almost very good level of basic knowledge of organization and management in a company.
- › 5,0 The student has a very good basic knowledge of organization and management in a company.

EU2 The student understands the complexity of management and organization processes and the role of the human factor.

- › 2,0 The student does not understand the complexity of management and organization processes and the role of the human factor.
- › 3,0 The student partially understands the complexity of management and organization processes and the role of the human factor.
- › 3,5 The student almost understands the complexity of management and organization processes and the role of the human factor.
- › 4,0 The student has a good understanding of the complexity of management and organization processes and the role of the human factor.
- › 4,5 The student understands the complexity of management and organization processes and the role of the human factor very well.
- › 5,0 The student very well understands the complexity of management and organization processes and the role of the human factor.

Polish course name	MATEMATYKA
English course name	MATHEMATICS
Course code	WIP-MDL-D1-MAT-01
Field of study	Material design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	1
Number of ECTS points	2
Ways of assessment	Test

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15		15		

TEACHERS:

Dr inż. Anita Ciekot,

Dr Sylwia Lara-Dziembek.

COURSE OBJECTIVES:

- › **C1** Making the students familiar with the basic elements of the number sequences and practical skills to solve typical problems being the subject of the lecture.
- › **C2** Acquaint students with the elements of theory of limits and continuity of the function of a single variable and practical skills to solve the typical problems being the subject of the lecture.
- › **C3** Making the students familiar with the basic elements of differential calculus for functions of a single variable and practical skills to solve typical problems being the subject of the lecture.
- › **C4** Making the students familiar with the basic elements of integral calculus for functions of a single variable and practical skills to solve typical problems being the subject of the lecture.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Knowledge of basic high school mathematical analysis.
2. Ability to solve elementary problems of mathematical analysis.
3. Ability to work independently and in group.
4. Ability to use different sources of information.

COURSE CONTENT

LECTURE

- › **L1, L2** Introduction to the mathematics course. Functions of a single real variable – domain, graphs, properties.
- › **L3, L4** Number sequences – basic definitions and theorems, limits.
- › **L5, L6** Functions of a single variable – limits of the function, limits at infinity, continuity, kinds of discontinuity.
- › **L7 - L10** Differential calculus for functions of a single variable – derivative, its interpretation and applications, asymptotes, monotonicity of function, local extreme points, convexity and concavity, points of inflection.
- › **L11, L12** Indefinite integral – definition of the antiderivatives and indefinite integral, table of basic integrals, substitution rule for indefinite integrals, integration by parts, integration of selected types of rational, irrational, and trigonometric functions.
- › **L13, L14** Definite integral – definition of the Riemann integral, basic properties of the definite integral, substitution rule and integration by parts formulas for definite integrals, geometrical application of the definite integral.
- › **L15** Passing the lecture.

CLASSES

- › **C1** Making the students familiar with the course requirements.
- › **C2** Determining the domain of a function, study of the properties of functions.
- › **C3, C4** Quiz 1. Testing monotonicity of sequences, determining the limits of number sequences.
- › **C5, C6** Quiz 2. Computing limits, testing the continuity of a function, determining the kind of discontinuity.
- › **C7 – C10** Quiz 3. Finding the derivatives of the function, computing limits using the L'Hospital rule, determining the asymptotes, local extreme points, points of inflection, testing monotonicity, convexity and concavity of the function.

- › **C11, C12** Quiz 4. Computing indefinite integral.
- › **C13, C14** Quiz 5. Computing definite integral. Applications of definite integrals.
- › **C15** Final test.

BASIC REFERENCES

1. M. Gewert, Z. Skoczylas: Analiza matematyczna 1, Definicje, twierdzenia wzory, Oficyna Wydawnicza GiS, Wrocław, 2005 r.
2. M. Gewert, Z. Skoczylas: Analiza matematyczna 1, Przykłady i zadania, Oficyna Wydawnicza GiS, Wrocław, 2005 r.
3. M. Gewert, Z. Skoczylas: Analiza matematyczna 2, Definicje, twierdzenia wzory, Oficyna Wydawnicza GiS, Wrocław, 2005 r.
4. M. Gewert, Z. Skoczylas: Analiza matematyczna 2, Przykłady i zadania, Oficyna Wydawnicza GiS, Wrocław, 2005 r.
5. W. Krywicki, L. Włodarski: Analiza matematyczna w zadaniach, PWN, Warszawa, 2019 r.
6. Elementy matematyki wyższej. Zadania z rozwiązaniami. Część 1, skrypt pod redakcją A. Ciekot, Wydawnictwo Politechniki Częstochowskiej, Częstochowa, 2021 r.
7. Polyanin A. D., Manzhirow A., V., Mathematics for engineers and scientists, Chapman & Hall/CRC, 2007 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. F. Leja: Rachunek różniczkowy i całkowy, PWN, Warszawa, 2021 r.
2. G.M. Fichtenholz: Rachunek różniczkowy i całkowy, PWN, Warszawa, 2009 r.
3. W. Stankiewicz: Zadania z matematyki dla wyższych uczelni technicznych, PWN, Warszawa, 2020 r.

LEARNING OUTCOMES

- › **EU1** The student has basic theoretical knowledge of the content presented in the lectures: number sequences, theorems and properties of limits of the function, continuity of the function, differential and integral calculus and its applications.

- › **EU2** The student is able to solve the problems of number sequences, limits of the function, continuity of the function, differential and integral calculus for functions of a single variable and applications of definite integrals.

TEACHING TOOLS

- › Lectures using multimedia presentations.
- › Traditional face-to-face, blackboard supported tutorials.
- › Lecture notes.
- › Problem sets for students.
- › CUT e-learning platform (possible use).

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

- › **F1.** Assessment of preparation for classes (during tutorials).
- › **F2.** Assessment of student's activity (during all types of classes).
- › **P1.** Assessment of mastery of the tutorials material – quizzes, achievement test.
- › **P2.** Assessment of mastery of the lecture material – passing the lecture (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		
Exam		
Total contact hours	30	1,2
Student's own work		
Getting acquainted with the indicated literature	7	0,28
Preparation for seminar		
Preparation for classes	7	0,28
Preparation for lab		
Project preparation		

Consultation	2	0,08
Preparation for the test	4	0,16
Total student's own work	20	0,8
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://km.pcz.pl/news.php

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_K02,	C1 - C4	L1 - L15	F2, P2
EU 2	K_W01, K_U01, K_K02,	C1 - C4	C1 - C15	F1, F2, P1

FORM OF ASSESSMENT - DETAILS

EU1 The student has basic theoretical knowledge of the content presented in the lectures: number sequences, theorems and properties of limits of the function, continuity of the function, differential and integral calculus and its applications.

- › 2,0 The student lacks knowledge of the basic definitions and theorems connected with number sequences, theorems and properties of limits of the function, continuity of the function, differential and integral calculus and its applications.
- › 3,0 The student has sufficient knowledge of the definitions and theorems given in the lectures: number sequences, theorems and properties of limits of the function, continuity of the function, differential and integral calculus and its

applications. The student has trouble with correct formal registration. However, the student can explain their meanings.

- › 3,5 The student has mastered the knowledge of the subject for grade 3,0 but has not mastered the knowledge of the subject for grade 4,0.
- › 4,0 The student knows most of the basic definitions and theorems connected with number sequences, theorems and properties of limits of the function, continuity of the function, differential and integral calculus and its applications.
- › 4,5 The student has mastered the knowledge of the subject for grade 4,0 but has not mastered the knowledge of the subject for grade 5,0.
- › 5,0 The student knows all the definitions, and theorems connected with number sequences, theorems and properties of limits of the function, continuity of the function, differential and integral calculus and its applications.

EU2 The student is able to solve the problems of number sequences, limits of the function, continuity of the function, differential and integral calculus for functions of a single variable and applications of definite integrals.

- › 2,0 The student is unable to apply the knowledge learned to solve problems of number sequences, limits of the function, continuity of the function, differential and integral calculus for functions of a single variable and applications of definite integrals.
- › 3,0 The student is partially able to apply the knowledge learned to solve problems of number sequences, limits of the function, continuity of the function, differential and integral calculus for functions of a single variable and applications of definite integrals. The student uses the indicated methods in solving elementary tasks, but the result of his work has slight calculation errors.
- › 3,5 The student has mastered the knowledge of the subject for grade 3,0 but has not mastered the knowledge of the subject for grade 4,0.
- › 4,0 The student is well able to apply the knowledge learned to solve tasks on number sequences, limits and continuity of functions of one variable, differential and integral calculus for functions of a single variable and its applications. The student is able to use all the methods learned to solve a variety of tasks.
- › 4,5 The student has mastered the knowledge of the subject for grade 4,0 but has not mastered the knowledge of the subject for grade 5,0.
- › 5,0 The student is very well able to apply the knowledge of the content presented in the lectures to solve tasks on number sequences, limits and

continuity of functions of one variable, differential and integral calculus for functions of a single variable and its applications. The student is able to appropriately choose a method for solving the task, justify the correctness of the choice and discuss the results.

Polish course name	OCHRONA WŁASNOŚCI INTELEKTUALNEJ
English course name	INTELLECTUAL PROPERTY PROTECTION
Course code	WIP-MDL-D1-IPP-01
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	1
Number of ECTS points	1
Ways of assessment	Test

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15				

TEACHERS:

Dr hab. inż. Tomasz Wyleciał, prof. PCz.,

Dr Agnieszka Bala-Litwiniak.

COURSE OBJECTIVES:

- › **C1** Acquainting students with the principles, concepts and procedures of intellectual protection law.
- › **C2** The aim of the course is to familiarize students with the most important issues in the field of intellectual property protection and the legal consequences of copyright infringement.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. The student has knowledge of the basics of using various sources of information regarding intellectual property.
2. Ability to work independently and in a group.
3. Skills of correct interpretation and presentation of one's own actions.

COURSE CONTENT

LECTURE

- › **L1** Information on the protection of intellectual property - philosophical and economic aspects.
- › **L2** Patent information - preparation for filing an invention, testing patentability, using patent databases to analyze own research topics.
- › **L3** Professional secrecy and personal data protection.
- › **L4** National, European and international procedure for granting patents.
- › **L5** Types and general characteristics of related rights.
- › **L6** Copyrights on the Internet.
- › **L7** Copyright restrictions.
- › **L8** Piracy, plagiarism and receiving stolen goods. Selected penal provisions.
- › **L9** Creation and expiry of copyright, public domain.
- › **L10** Protection of scientific works.
- › **L11** Organizations of collective copyright management.
- › **L12, L13** Employee and scientific works. Graduate rights.
- › **L14, L15** Analysis of selected patents.

BASIC REFERENCES

1. Poźniak-Niedzielska M., Szczotka J.: Prawo autorskie zarys problematyki, Wolters Kluwer, Warszawa 2020 r.
2. Kostański P., Żelechowski Ł.: Prawo własności przemysłowej, C.H. Beck, Warszawa 2020 r.
3. Kotarba W.: Ochrona własności intelektualnej, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2012 r.
4. Sieńczyło – Chlabicz J.: Prawo własności intelektualnej, Wolters Kluwer, Warszawa 2018 r.
5. Current laws, regulations and standards, concerning copyright and related rights.
6. Current laws, regulations and standards, relating to industrial property rights.

SUPPLEMENTARY REFERENCE MATERIALS

LEARNING OUTCOMES

- › **EU1** Student is able to identify, interpret and forecast phenomena in the area of intellectual property.
- › **EU2** Student knows and understands the basic concepts, principles of intellectual property protection and legal consequences of copyright infringement.
- › **EU3** Student describes instruments for the protection of intellectual property and industrial property.

TEACHING TOOLS

- › Lecture with the use of audiovisual aids.
- › Examples of patent documents, protection rights and registration rights.

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

- › **F1.** Assessment of the implementation of tasks included in the curriculum.
- › **P1.** Assessment of the ability to solve the problems posed and the method of presenting the obtained results - credit with a grade.
- › **P2.** Assessment of the mastery of the teaching material within the lectures - final test.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures	15	0,6
Seminar		
Classes		
Laboratory		
Project		
Test	1	0,04
Exam		
Total contact hours	16	0,64
Student's own work		
Getting acquainted with the indicated literature	5	0,2

Preparation for seminar		
Preparation for classes		
Preparation for lab		
Project preparation		
Consultation	2	0,08
Preparation for the test	2	0,08
Total student's own work	9	0,36
Total number of hours/ ECTS points for the course	25	1,0

ADDITIONAL INFORMATION

Timetable of classes	
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_W08, K_W09, K_U06, K_U08, K_K01,	C1, C2	L1 - L15	F1, P1, P2
EU 2	K_W08, K_W09, K_U06, K_U08, K_K01,	C1, C2	L1 - L15	F1, P1, P2
EU 3	K_W08, K_W09, K_U06, K_U08, K_K01,	C1, C2	L1 - L15	F1, P1, P2

FORM OF ASSESSMENT - DETAILS

EU1 Student is able to recognize, interpret and forecast phenomena in the area of intellectual property.

- › 2,0 Student is not able to recognize, interpret and forecast phenomena in the area of intellectual property.
- › 3,0 Student is partially able to recognize, interpret and forecast phenomena in the area of intellectual property.
- › 3,5 Student is almost able to recognize, interpret and forecast phenomena in the area of intellectual property.
- › 4,0 Student is able to recognize, interpret and forecast well the phenomena in the area of intellectual property.
- › 4,5 Student is able to identify, interpret and forecast phenomena in the area of intellectual property almost very well.
- › 5,0 Student is very good at identifying, interpreting and forecasting phenomena in the area of intellectual property.

EU2 Student knows and understands the basic concepts, principles of intellectual property protection and legal consequences of copyright infringement.

- › 2,0 Student cannot and does not understand the basic concepts, principles of intellectual property protection and legal consequences of copyright infringement.
- › 3,0 Student partially knows and understands the basic concepts, principles of intellectual property protection and legal consequences of copyright infringement.
- › 3,5 Student knows and understands the basic concepts, principles of intellectual property protection and legal consequences of copyright infringement.
- › 4,0 Student knows and understands the basic concepts, principles of intellectual property protection and legal consequences of copyright infringement.
- › 4,5 Student knows and understands very well the basic concepts, principles of intellectual property protection and legal consequences of copyright infringement.
- › 5,0 Student very well knows and understands the basic concepts, principles of intellectual property protection and legal consequences of copyright infringement.

EU3 Student describes instruments for the protection of intellectual property and industrial property.

- › 2,0 Student is not able to describe the instruments of intellectual property and industrial property protection.

- › 3,0 Student partially describes the instruments of intellectual property and industrial property protection.
- › 3,5 Student describes the instruments of intellectual and industrial property protection in law.
- › 4,0 Student describes the instruments for the protection of intellectual property and industrial property well.
- › 4,5 Student describes the instruments for the protection of intellectual property and industrial property almost very well.
- › 5,0 Student describes the instruments for the protection of intellectual property and industrial property very well.

Polish course name	PODSTAWY EKONOMII
English course name	ECONOMY BASICS
Course code	WIP-MDL-D1-EB-01
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	1
Number of ECTS points	5
Ways of assessment	Exam

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15		30		

TEACHERS:

Dr hab. inż. Rafał Prusak, prof. PCz.,

Dr inż. Monika Górską,

Dr inż Dominika Strycharska.

COURSE OBJECTIVES:

- › **C1** Provide students with knowledge of basic concepts, problems and tools of economic analysis.
- › **C2** To acquaint students with the basic macroeconomic categories and tools enabling the implementation of economic policy.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. General knowledge about the structure of the economy and its elements.
2. Abilities to work independently and in a group.
3. General knowledge about relations between economic entities.
4. General knowledge of the links between parts of the economy.
5. Ability to work independently and in a group.
6. Ability to use literature sources and internet resources.

COURSE CONTENT

LECTURE

- › **L1** Basics of economics, basic goals and economic categories. Basic problems of economic choice. Basic actors in a market economy.
- › **L2** The state as an entity regulating the economy. The role of the state in a market economy.
- › **L3** State budget and fiscal policy.
- › **L4** Money, money market. State monetary policy.
- › **L5** Inflation and unemployment.
- › **L6** Economic growth. Measures of economic growth and development.
- › **L7** Participants in the management process and connections between them.
- › **L8** Theory of rational consumer behaviour.
- › **L9** The theory of enterprise functioning.
- › **L10** Practical methods of business evaluation.
- › **L11** International exchange. Globalization.

CLASSES

- › **C1** Fundamentals of the theory of consumer choice.
- › **C2** Production and costs in the enterprise.
- › **C3** Product and national income. National income determinants.
- › **C4** Business cycle.
- › **C5** Unemployment.
- › **C6** Inflation.
- › **C7** Elements of trade policy.
- › **C8** The IS-LM model.

BASIC REFERENCES

1. R.E. Hall, J.B. Taylor, Makroekonomia: Teoria funkcjonowania i polityka. Wydawnictwo Naukowe PWN, Warszawa, 2015 r.
2. P. Krugman, R. Wells, Makroekonomia, PWN, Warszawa 2012 r.
3. N.G. Mankiw, P.M. Taylor, Makroekonomia, PWE, Warszawa 2008 r.
4. N. Gregory Mankiw, Mark P. Taylor, Mikroekonomia, PWE, Makroekonomia.

SUPPLEMENTARY REFERENCE MATERIALS

1. Steven A. Greenlaw, University Of Mary Washington, David Shapiro, Pennsylvania State University, Waldemar Karpa, Akademia Leona Koźmińskiego, Piotr Maszczyk, Szkoła Główna Handlowa W Warszawie, Podstawy ekonomii, OpenStax Poland, 2022 r.

LEARNING OUTCOMES

- › **EU1** The student has the knowledge enabling him to solve basic economic problems with the use of economic analysis tools.
- › **EU2** The student is able to distinguish and indicate the basic economic categories and knows the tools enabling the implementation of economic policy.

TEACHING TOOLS

- › Multimedia presentations.
- › CUT e-learning platform (possible use).

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

- › **F1.** Assessment of the implementation of tasks included in the curriculum.
- › **F2.** Assessment of the mastery of the teaching material being the subject of exercise tasks - final test.
- › **P1.** Assessment of the mastery of the teaching material during lectures – exam.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures	15	0,6
Seminar		
Classes	30	1,2
Laboratory		
Project		
Test	4	0,16
Exam	2	0,08
Total contact hours	51	2,04
Student's own work		
Getting acquainted with the indicated literature	20	0,8

Preparation for seminar		
Preparation for classes	30	1,2
Preparation for lab		
Project preparation		
Consultation	4	0,16
Preparation for the exam	20	0,8
Total student's own work	74	2,96
Total number of hours/ ECTS points for the course	125	5,0

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_W07, K_W08, K_U07, K_U08, K_K03,	C1 C2	L1 - L11 C1 - C8	F1, F2, P1
EU 2	K_W01, K_W07, K_W08, K_U07, K_U08, K_K03,	C1 C2	L1 - L11 C1 - C8	F1, F2, P1

FORM OF ASSESSMENT - DETAILS

EU1 The student has the knowledge enabling him to solve basic economic problems with the use of economic analysis tools.

- › 2,0 The student does not have the knowledge enabling him to solve basic economic problems.
- › 3,0 The student partially has the basic knowledge enabling him to solve basic economic problems.
- › 3,5 The student almost knows the basics of knowledge enabling him to solve basic economic problems
- › 4,0 The student knows the basics of knowledge well, enabling him to solve basic economic problems with the use of the indicated tools of economic analysis.
- › 4,5 The student knows almost very well the basics of knowledge enabling him to solve basic economic problems with the use of the indicated tools of economic analysis.
- › 5,0 The student knows the basics of knowledge very well, enabling him to solve basic economic problems, independently selecting the tools of economic analysis

EU2 The student is able to distinguish and indicate the basic economic categories and knows the tools enabling the implementation of economic policy.

- › 2,0 The student is not able to distinguish and indicate the basic economic categories.
- › 3,0 The student is partially able to distinguish and indicate the basic economic categories.
- › 3,5 The student is almost able to distinguish and indicate the basic economic categories.
- › 4,0 The student is able to distinguish and indicate the basic economic categories well and knows the basic tools enabling the implementation of economic policy.
- › 4,5 The student is able to distinguish and indicate the basic economic categories very well and knows the basic tools enabling the implementation of economic policy.
- › 5,0 The student is very good at distinguishing and indicating the basic economic categories and knows the tools enabling the implementation of economic policy.

Polish course name	CHEMIA MATERIAŁÓW
English course name	MATERIALS CHEMISTRY
Course code	WIP-MDL-D1-MCH-01
Field of study	Material design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	1
Number of ECTS points	5
Ways of assessment	Test

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
30		15	15	

TEACHERS:

Dr hab. inż. Jerzy Gęga, prof. PCz.,
 Dr hab. inż. Krystyna Giza, prof. PCz.,
 Dr hab. Lidia Adamczyk, prof. PCz.,
 Dr hab. Beata Pośpiech, prof. PCz.,
 Dr inż. Karina Jagielska-Wiaderek,
 Dr Edyta Owczarek.

COURSE OBJECTIVES:

- › **C1** Providing students with knowledge of general chemistry in relation to the physico-chemical properties of modern engineering materials.
- › **C2** Obtaining by the students the practical skills in performing chemical calculations and experiments and elaborating their results.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Knowledge of mathematics, physics and chemistry at the basic level
2. Ability to work independently and in a group.
3. Ability to use literature sources and internet resources.

COURSE CONTENT

LECTURE

- › **L1** Structure of the atom. Periodic table of elements. Chemistry as a source of modern materials.
- › **L2** Chemical bonds and intermolecular interactions and their influence on the physico-chemical properties of materials.
- › **L3** States of matter.
- › **L4** Molecular and ionic chemical reactions as methods for obtaining materials.
- › **L5** Chemical kinetics and statics. Catalysis and catalysts.
- › **L6** Equilibria in electrolyte solutions.
- › **L7** Redox reactions. Electrochemistry. Electrochemical energy sources.
- › **L8** Corrosion protection of metallic materials.
- › **L9, L10** Metals and alloys. Properties and methods of obtaining selected metals (iron, copper, zinc, aluminium) from primary and secondary materials.
- › **L11** Lanthanides - properties and their applications in modern magnetic and optoelectronic materials.
- › **L12** Non-metals. Chemistry of carbon compounds. Natural and synthetic polymers.
- › **L13** Silicon. Semiconductors. Silicate polymers.
- › **L14** Sol-gel derived materials.
- › **L15** Final test.

CLASSES

- › **C1, C2** Nomenclature, molecular and structural formulae of inorganic compounds. Valence and degree of oxidation of elements.
- › **C3, C4** Molecular and ionic reaction equations. Redox reactions.
- › **C5, C6** Stoichiometric calculations. Molar and percentage concentration.
- › **C7, C8** Equilibrium state in a chemical reaction. The rule of contrariety.
- › **C9, C10** Dissociation of strong and weak electrolytes in aqueous solutions, pH.
- › **C11, C12** Electrochemical cells.
- › **C13, C14** Electrolytic preparation of materials. Faraday's laws of electrolysis.
- › **C15** Final test.

LABORATORY

- › **Lab1, Lab2** Health and safety training. Regulations of the chemistry laboratory. Technique of basic laboratory operations.
- › **Lab3, Lab4** Methods of obtaining and properties of selected inorganic compounds.
- › **Lab5, Lab6** Ionic reactions.
- › **Lab7, Lab8** Dissociation and pH in solutions of weak and strong electrolytes.
- › **Lab9, Lab10** Redox reactions.
- › **Lab11, Lab12** Basics of electrochemistry and corrosion of metallic materials.
- › **Lab13, Lab14** Identification of selected plastics.
- › **Lab15** Final test.

BASIC REFERENCES

1. P. Atkins, L. Jones, L. Laverman, Chemia ogólna, WN PWN, Warszawa 2020 r.
2. L. Jones, P. Atkins, Chemia ogólna. Cząsteczki, materia, reakcje, PWN, Warszawa 2014 r.
3. H. Bala, Wstęp do Chemii Materiałów, WNT Warszawa 2003 r.
4. H. Bala, V.A. Gaudyn, J. Gęga, P. Siemion, Podstawy obliczeń w chemii ogólnej, Seria: Metalurgia, nr 57, Wyd WIPMiFS PCz, Częstochowa 2013 r.
5. J. Siedlecka, G. Pawłowska, E. Owczarek, M. Biczak, Chemia ogólna. Ćwiczenia rachunkowe i laboratoryjne z podstaw chemii, Politechnika Częstochowska, Częstochowa 1997 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. A. Bielański, Podstawy chemii nieorganicznej, WN PWN, Warszawa 2010 r.
2. P. Mastalerz, Chemia organiczna, Wyd. Chemiczne, Wrocław 2016 r.
3. K.W. Whitten (ed.), Chemistry, Thomson Higher Education, Belmont 2007 r.
4. F.J. Owens, C.P. Poole Jr., The Physics and Chemistry of Nanosolids, John Wiley and Sons, Inc., New Jersey 2008 r.

LEARNING OUTCOMES

- › **EU1** The student knows the structure of matter and the most important groups of chemical compounds and is able to relate these to the physicochemical properties of engineering materials.

- › **EU2** The student will know basic chemical concepts and laws and be able to apply them to describe chemical reactions and properties of substances.
- › **EU3** The student will be able to plan and carry out simple chemical experiments, make observations and draw independent conclusions about the exercises carried out.

TEACHING TOOLS

- › Multimedia presentations.
- › Charts, boards.
- › Laboratory equipment and guides.
- › CUT e-learning platform (possible use).

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

- › **F1.** Evaluation of current preparation and activity during classes.
- › **F2.** Evaluation of current preparation and activity during laboratory classes.
- › **P1.** Evaluation of mastering the knowledge within the lectures – final test.
- › **P2.** Evaluation of mastering the knowledge within the classes – final test.
- › **P3.** Evaluation of mastering the skills during laboratory classes – final test.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures	30	1,2
Seminar		
Classes	15	0,6
Laboratory	15	0,6
Project		
Test	4	0,16
Exam		
Total contact hours	64	2,56
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	15	0,6
Project preparation		
Consultation	4	0,16
Preparation for the test	12	0,48
Total student's own work	61	2,44
Total number of hours/ ECTS points for the course	125	5,0

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_W04, K_U03, K_U04, K_K01, K_K02,	C1	L1 - L15	P1
EU 2	K_W01, K_W04, K_U03, K_U04, K_U09, K_K01, K_K02,	C2	L1 - L15 C1 - C15	F1, P2
EU 3	K_W01, K_W03, K_U03, K_U04, K_U09, K_K01, K_K02,	C2	Lab1 - Lab15	F2, P3

FORM OF ASSESSMENT - DETAILS

EU1 The student knows the structure of matter and the most important groups of chemical compounds and is able to relate these to the physicochemical properties of engineering materials.

- › 2,0 The student does not know the structure of matter and the most important groups of chemical compounds.
- › 3,0 The student partially knows the structure of matter and some groups of chemical compounds and partially knows how to relate them to the physicochemical properties of engineering materials.
- › 3,5 The student almost knows the structure of matter and selected groups of chemical compounds and almost knows how to relate them to the physicochemical properties of engineering materials.
- › 4,0 The student knows well the structure of matter and the major groups of chemical compounds and correctly knows how to relate them to the physicochemical properties of engineering materials.
- › 4,5 The student knows almost very well the structure of matter and the most important groups of chemical compounds and knows how to relate them to the physicochemical properties of engineering materials.
- › 5,0 The student knows very well the structure of matter and the most important groups of chemical compounds and knows how to relate them to the physicochemical properties of engineering materials.

EU2 The student will know basic chemical concepts and laws and be able to apply them to describe chemical reactions and properties of substances.

- › 2,0 The student does not know basic chemical concepts and laws.
- › 3,0 The student partially knows basic chemical concepts and laws and is able to apply them to describe chemical reactions and properties of substances.
- › 3,5 The student is almost familiar with basic chemical concepts and laws and is able to apply them to describe chemical reactions and properties of substances.
- › 4,0 The student knows basic chemical concepts and laws well and is able to apply them to describe chemical reactions and properties of substances.
- › 4,5 The student knows basic chemical concepts and laws almost very well and is able to apply them to describe chemical reactions and properties of substances.
- › 5,0 The student knows basic chemical concepts and laws very well and is able to apply them to describe chemical reactions and properties of substances.

EU3 The student will be able to plan and carry out simple chemical experiments, make observations and draw independent conclusions about the exercises carried out.

- › 2,0 The student is not able to plan and carry out simple chemical experiments, make observations and draw conclusions independently concerning the exercises performed.
- › 3,0 The student is partially able to plan and carry out simple chemical experiments, make observations and draw conclusions independently concerning the exercises performed.
- › 3,5 The student is almost able to plan and carry out simple chemical experiments, make observations and draw conclusions independently concerning the exercises performed.
- › 4,0 The student is well able to plan and carry out simple chemical experiments, make observations and draw conclusions independently concerning the exercises performed.
- › 4,5 The student can almost very well plan and carry out simple chemical experiments, make observations and draw conclusions independently concerning the exercises performed.
- › 5,0 The student is able to plan and carry out simple chemical experiments, make observations and draw conclusions independently concerning the exercises performed.

Polish course name	ODDZIAŁYWANIE PRZEDSIĘBIORSTWA NA ŚRODOWISKO
English course name	THE IMPACT OF THE COMPANY ON THE ENVIRONMENT
Course code	WIP-MDL-D1-TIOTC-01
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	1
Number of ECTS points	4
Ways of assessment	Test

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15		30		

TEACHERS:

Dr hab. inż. Monika Zajemska, prof. PCz.,

Dr inż. Sławomir Morel.

COURSE OBJECTIVES:

- › **C1** Providing students with knowledge of the impact of industrial activities on the natural environment.
- › **C2** Acquisition by students of practical skills in the field of calculating the amount of emissions and emission factors from the processes of combustion and thermal conversion of fuels and waste.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Basic knowledge of chemistry, thermodynamics and ecology.
2. Ability to work independently and in a group.
3. Ability to use literature sources and internet resources.

COURSE CONTENT

LECTURE

- › **L1** Introduction to the subject: Basic definitions, concepts and units.
- › **L2** Types of pollution and sources of their formation.
- › **L3, L4** Fuel combustion processes as the main source of pollutant emissions to the natural environment.
- › **L5, L6, L7** The impact of solid and liquid fuel combustion on the natural environment.
- › **L8, L9** The impact of combustion of gaseous fuels on the natural environment.
- › **L10, L11** The impact of thermal waste treatment on the environment.
- › **L12** The mechanism of formation of selected gaseous pollutants.
- › **L13** The mechanism of dust pollution formation.
- › **L14** Pollution reduction methods.
- › **L15** Final test.

CLASSES

- › **C1 - C4** Calculation of the chemical composition of exhaust gases for gaseous fuels.
- › **C5 - C8** Calculation of exhaust gas chemical composition for solid and liquid fuels.
- › **C9** Test.
- › **C10 - C14** Calculation of the emissions and emission factors of gaseous pollutants.
- › **C15** Final test.

BASIC REFERENCES

1. [Małachowski](#) K., Gospodarka a środowisko i ekologia, Warszawa 2020 r.
2. Zajemska M.: Modelowanie numeryczne składu chemicznego spalin w piecach grzewczych. Monografie nr 37, Częstochowa 2013 r.
3. Zajemska M., Radomiak H., Symulacje numeryczne powstawania zanieczyszczeń gazowych podczas spalania tlenowego. Rozdział w monografii pod redakcją Wojciech Nowak, Marek Ściążki i Tomasz Czakiert „Spalanie tlenowe dla kotłów pyłowych i fluidalnych zintegrowanych z wychwytem CO₂. Doświadczenia z instalacji pilotowych i perspektywy dla instalacji demonstracyjnych. Częstochowa 2015 r., s. 271-290.

4. Nocoń J., Poznański J., Słupek S., Rywotycki M., *Technika cieplna: przykłady z techniki procesów spalania*. Wyd. 3 zm. popr. Kraków, AGH Uczelniane Wydawnictwa Naukowo-Dydaktyczne, 2007 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. Kubicka J., Kupczyk T., *Wpływ mikro i małych przedsiębiorstw na środowisko naturalne i ich działania na rzecz zrównoważonego rozwoju*, Prace naukowe Uniwersytetu Ekonomicznego we Wrocławiu, nr XXX, 2015 r.

LEARNING OUTCOMES

- › **EU1** Student has the theoretical knowledge concerning the influence of industrial technologies on the environment.
- › **EU2** Student has the practical knowledge in the field of calculating the chemical composition of exhaust gases from combustion installations and thermal processing of fuels and waste, as well as emission factors.

TEACHING TOOLS

- › Multimedia presentations.
- › Dry erase magnetic board.

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

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

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

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures	15	0,6
Seminar		
Classes	30	1,2
Laboratory		

Project		
Test		
Exam		
Total contact hours	45	1,8
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	5	0,2
Preparation for the test	20	0,8
Total student's own work	55	2,2
Total number of hours/ ECTS points for the course	100	4,0

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_W03, K_W08, K_U01, K_U03, K_U06, K_K01, K_K02,	C1	L1 - L15	P1

EU 2	K_W01, K_W03, K_W08, K_U01, K_U03, K_U06, K_K01, K_K02,	C2	C1 - C15	F1, F2
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FORM OF ASSESSMENT - DETAILS

EU1 Student has the theoretical knowledge concerning the influence of industrial technologies on the environment.

- › 2,0 The student does not know the basic rules of the company's environmental impact.
- › 3,0 The student partially knows the basic rules of the company's environmental impact.
- › 3,5 The student almost knows the basic rules of the company's environmental impact.
- › 4,0 The student knows the rules of the enterprise's environmental impact well.
- › 4,5 The student knows almost very well the rules of the enterprise's environmental impact.
- › 5,0 The student knows very well the basic rules of the company's environmental impact.

EU2 Student has the practical knowledge in the field of calculating the chemical composition of exhaust gases from combustion installations and thermal processing of fuels and waste, as well as emission factors.

- › 2,0 Student is not able to calculate chemical composition of exhaust gases from combustion and thermal processing of fuels and waste installations and emission factors.
- › 3,0 Student is able to partially calculate the chemical composition of exhaust gases from combustion installations and thermal processing of fuels and waste as well as emission factors.
- › 3,5 The student can almost calculate the chemical composition of exhaust gases from the combustion and thermal processing of fuels and waste as well as the emission factors.
- › 4,0 The student is able to calculate the chemical composition of exhaust gases from combustion installations and thermal processing of fuels and waste as well as emission factors.

- › 4,5 The student is able to calculate the chemical composition of exhaust gases from combustion and thermal processing installations of fuels and waste almost very well, as well as the emission factors.
- › 5,0 The student is able to calculate very well the chemical composition of exhaust gases from combustion installations and thermal processing of fuels and waste, as well as emission factors.

Polish course name	ZRÓWNOWAŻONY ROZWÓJ
English course name	SUSTAINABLE DEVELOPMENT
Course code	WIP-MDL-D1-SD-01
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	1
Number of ECTS points	4
Ways of assessment	Test

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15		30		

TEACHERS:

Dr hab. inż. Monika Zajemska, prof. PCz.,

Dr inż. Sławomir Morel.

COURSE OBJECTIVES:

- › **C1** Providing students with knowledge in the field of sustainable development.
- › **C2** Acquisition by students of practical skills to assess the level of sustainable activity of selected economic entities.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Basic knowledge of ecology.
2. Ability to work independently and in a group.
3. Ability to use literature sources and internet resources.

COURSE CONTENT

LECTURE

- › **L1** Introduction to the issues of sustainable development.
- › **L2** Sustainability initiatives.

- › **L3** Sustainable development in legal documents.
- › **L4** Sustainability indicators.
- › **L5** Tools for implementing sustainable development.
- › **L6 - L13** Ecological, social and economic aspects of sustainable development.
- › **L14** Assessment of sustainable development activities in Poland and in the European Union countries.
- › **L15** Final test.

CLASSES

- › **C1 - C14** Case study of sustainable activity of selected economic entities using SWOT analysis - environmental, economic and ecological aspects.
- › **C15** Final test.

BASIC REFERENCES

1. Wskaźniki zrównoważonego rozwoju Polski 2015, GUS, Katowice 2015 r.
2. Kronenberg J., Bergier T. (red.): Wyzwania zrównoważonego rozwoju w Polsce, Fundacja Sendzimira, Kraków 2010 r.
3. Kielczewski D. (red.): Od koncepcji ekorozwoju do ekonomii zrównoważonego rozwoju, Wydawnictwo Wyższej Szkoły Ekonomicznej w Białymstoku, Białystok 2009 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. Agenda na rzecz zrównoważonego rozwoju 2030, ONZ, 2015 r.

LEARNING OUTCOMES

- › **EU1** Student has theoretical knowledge in the field of economic, social and ecological conditions of running a business in the context of sustainable development.
- › **EU2** Student has practical knowledge in the analysis and assessment of the level of sustainable activity of selected economic entities.

TEACHING TOOLS

- › Audiovisual media.

- › Dry erase magnetic board.

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

- › **F1.** Assessment of the implementation of tasks included in the curriculum.
- › **F2.** Assessment of the mastery of the teaching material being the subject of exercises - final test.
- › **P1.** Assessment of the mastery of the teaching material within the lectures - final test.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures	15	0,6
Seminar		
Classes	30	1,2
Laboratory		
Project		
Test		
Exam		
Total contact hours	45	1,8
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	5	0,2
Preparation for the test	20	0,8
Total student's own work	55	2,2
Total number of hours/ ECTS points for the course	100	4,0

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_W06, K_W07, K_W08, K_U04, K_K01	C1	L1 - L15	P1
EU 2	K_W01, K_W06, K_W07, K_U04, K_U06, K_U08, K_K01, K_K02, K_K03	C2	C1 - C15	F1, F2

FORM OF ASSESSMENT - DETAILS

EU1 Student has theoretical knowledge in the field of economic, social and ecological conditions of running a business in the context of sustainable development.

- › 2,0 Student doesn't know the basic conditions of running a business in the context of sustainable development.
- › 3,0 Student partially knows the basic conditions of running a business in the context of sustainable development.
- › 3,5 Student knows the basic conditions of running a business in the context of sustainable development.
- › 4,0 Student knows well the conditions of running a business in the context of sustainable development.
- › 4,5 Student knows the conditions of running a business in the context of sustainable development almost very well.

- › 5,0 Student knows the basic conditions of running a business in the context of sustainable development very well.

EU2 Student has practical knowledge in the analysis and assessment of the level of sustainable activity of selected economic entities.

- › 2,0 Student is unable to analyze and evaluate the level of sustainable activity of selected economic entities.
- › 3,0 Student is partially able to analyze and evaluate the level of sustainable activity of selected economic entities.
- › 3,5 Student is able to analyze and assess the level of sustainable activity of selected economic entities.
- › 4,0 Student is able to analyze and assess the level of sustainable activity of selected economic entities.
- › 4,5 Student is able to analyze and assess the level of sustainable activity of selected economic entities almost very well.
- › 5,0 Student is able to analyze and assess the level of sustainable activity of selected economic entities very well.

Polish course name	NAUKA O MATERIAŁACH
English course name	MATERIALS SCIENCE
Course code	WIP-MDL-D1-MS-01
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full - time
Semester	1
Number of ECTS points	6
Ways of assessment	Exam

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
30		15	30	

TEACHERS:

Dr hab. inż. Monika Gwoździk.

COURSE OBJECTIVES:

- › **C1** Providing students with knowledge of materials science.
- › **C2** Acquisition by students of practical knowledge aimed at applying the basic groups of materials.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Knowledge of physics.
2. Knowledge of mathematics.
3. Knowledge of chemistry.
4. Ability to use various sources of information, including manuals and technical documentation, as well as literature sources and Internet resources.
5. Ability to work independently and in a group.
6. Skills of correct interpretation and presentation of research results.

COURSE CONTENT

LECTURE

- › **L1** Introduction to materials science - meaning and development trends.
- › **L2** Basic groups of materials.
- › **L3** Structure and strengthening of metals and alloys.
- › **L4** Shaping the structure and properties of materials.
- › **L5** Metals and their alloys.
- › **L6** Non-metallic materials.
- › **L7** Functional and special materials.

CLASSES

- › **C1** Analysis of phase equilibrium systems, lever rule, Gibbs phase rule.
- › **C2** Determining the grain size.
- › **C3** Linear method for analyzing the share of structural components.
- › **C4** Point method for analyzing the share of structural components.
- › **C5** Calculation of mechanical properties. Final test.

LABORATORY

- › **Lab1** Thermal analysis.
- › **Lab2** Crush and recrystallization.
- › **Lab3** Macroscopic examinations.
- › **Lab4** Microscopic examination.
- › **Lab5** Research on surface stereometry.
- › **Lab6** X-ray examinations.
- › **Lab7** Mechanical research. Final test.

BASIC REFERENCES

1. A. Dudek, M. Gwoździk: Ćwiczenia laboratoryjne z metaloznawstwa stopów żelaza. Wydawnictwo Politechniki Częstochowskiej, Częstochowa 2010 r.
2. K. Przybyłowicz: Nowoczesne metaloznawstwo. Wydawnictwo naukowe AKAPIT, Kraków 2012 r.
3. M. Głowacka, A. Zieliński (pod red.): Podstawy materiałoznawstwa. Wydawnictwo Politechniki Gdańskiej, Gdańsk 2014 r.
4. J.F. Biernat: Materiałoznawstwo. Wydawnictwo Politechniki Gdańskiej, Gdańsk 2016 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. J. Sitko: Wprowadzenie do nauki o materiałach. Wydawnictwo Politechniki Śląskiej, Gliwice 2015 r.
2. M. Blicharski: Inżynieria Materiałowa. Wydawnictwo WNT, Warszawa 2017 r.

LEARNING OUTCOMES

- › **EU1** The student has mastered the knowledge of materials science.
- › **EU2** The student is able to analyze the results of the research and prepare a report on selected laboratory exercises.

TEACHING TOOLS

- › Multimedia devices.
- › Teaching laboratories.
- › E-learning platform the Częstochowa University of Technology or other distance learning tools.

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

- › **F1.** Assessment of reports on the implementation of selected laboratory exercises included in the curriculum.
- › **P1.** Assessment of the mastery of the teaching material being the subject of exercises - final test.
- › **P2.** Assessment of the mastery of the teaching material being the subject of the laboratory - final test.
- › **P3.** Assessment of the mastery of the teaching material being the subject of lectures - exam.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures	30	1,2
Seminar		
Classes	15	0,6
Laboratory	30	1,2

Project		
Test		
Exam	2	0,08
Total contact hours	77	3,08
Getting acquainted with the indicated literature	15	0,6
Preparation for seminar		
Preparation for classes	10	0,4
Preparation for lab	15	0,6
Project preparation		
Consultation	3	0,12
Preparation for the exam	30	1,2
Total student's own work	73	2,92
Total number of hours/ ECTS points for the course	150	6,0

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_W03, K_U04, K_U05, K_K02,	C1, C2	L1 - L7 Lab1 - Lab7 C1 - C5	P1, P2, P3

	K_K03,			
EU 2	K_W01, K_W03, K_U04, K_U05, K_K02, K_K03,	C1, C2	Lab1 - Lab7	F1

FORM OF ASSESSMENT - DETAILS

EU1 The student has mastered the knowledge of materials science.

- › 2,0 The student has not mastered the knowledge of materials science.
- › 3,0 The student mastered the knowledge of materials science in a basic way.
- › 3,5 The student has sufficiently plus mastered the knowledge of materials science.
- › 4,0 The student mastered the knowledge of materials science in depth.
- › 4,5 The student has mastered the knowledge of materials science in a good way.
- › 5,0 The student mastered the knowledge of materials science in an in-depth and extended manner.

EU2 The student is able to analyze the results of the research and prepare a report on selected laboratory exercises.

- › 2,0 The student is not able to prepare a report on the course of research.
- › 3,0 The student is able to prepare a report giving test results and calculations of individual properties as well as conduct a basic analysis of the test results.
- › 3,5 The student is able to prepare a report giving the test results and calculations of individual properties, as well as to perform sufficiently plus the analysis of the test results.
- › 4,0 The student is able to prepare a report on the conducted research and carry out an in-depth analysis of the research results.
- › 4,5 The student is able to prepare a report on the research carried out and perform a good analysis of the research results.
- › 5,0 The student is able to prepare a report on the conducted research and analyze the results of this research in an in-depth and extended way, and to formulate conclusions.

Polish course name	MATERIAŁY INŻYNIERSKIE
English course name	ENGINEERING MATERIALS
Course code	WIP-MDL-D1-EM-01
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full - time
Semester	1
Number of ECTS points	6
Ways of assessment	Exam

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
30		15	30	

TEACHERS:

Dr hab. inż. Monika Gwoździk.

COURSE OBJECTIVES:

- › **C1** Provide students with knowledge about engineering materials, their nomenclature and properties.
- › **C2** Acquainting students with research methods and techniques of producing engineering materials.
- › **C3** Acquisition by students of practical knowledge aimed at applying the basic groups of engineering materials.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Knowledge of physics.
2. Knowledge of mathematics.
3. Knowledge of chemistry.
4. Ability to use various sources of information, including manuals and technical documentation, as well as literature sources and Internet resources.
5. Ability to work independently and in a group.
6. Skills of correct interpretation and presentation of research results.

COURSE CONTENT

LECTURE

- › **L1** Review of engineering materials.
- › **L2** The importance of engineering materials.
- › **L3** Metals and their alloys - mechanisms of crystallization, plastic deformation and recrystallization of metals, heat treatment, structure, properties, use of metallic materials.
- › **L4** Ceramic materials - classification, manufacturing technologies, structure characteristics, properties and application.
- › **L5** Polymer materials - classification and nomenclature of polymers, polymerization, modification, production of polymers, structure characteristics, properties and application.
- › **L6** Composite materials - components, characteristics and methods of their production, principles of strengthening composites depending on the geometry of the strengthening phase and the type of components, composite technologies, structure, properties and application of composite materials.
- › **L7** Working conditions for engineering materials.
- › **L8** Consumption of engineering materials.

CLASSES

- › **C1** Stereology of engineering materials - calculations.
- › **C2 - C5** Properties of engineering materials - calculations. Final test.

LABORATORY

- › **Lab1** Structure and properties of metallic engineering materials.
- › **Lab2** Structure and properties of ceramic engineering materials.
- › **Lab3** Structure and properties of polymer engineering materials.
- › **Lab4** Structure and properties of composite engineering materials. Final test.

BASIC REFERENCES

1. A. Dudek, M. Gwoździk: Ćwiczenia laboratoryjne z metaloznawstwa stopów żelaza. Wydawnictwo Politechniki Częstochowskiej, Częstochowa 2010 r.
2. K. Przybyłowicz: Nowoczesne metaloznawstwo. Wydawnictwo naukowe AKAPIT, Kraków 2012 r.
3. M. Głowacka, A. Zieliński (pod red.): Podstawy materiałoznawstwa. Wydawnictwo Politechniki Gdańskiej, Gdańsk 2014 r.
4. J.F. Biernat: Materiałoznawstwo. Wydawnictwo Politechniki Gdańskiej, Gdańsk 2016 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. J. Sitko: Wprowadzenie do nauki o materiałach. Wydawnictwo Politechniki Śląskiej, Gliwice 2015 r.
2. M. Blicharski: Inżynieria Materiałowa. Wydawnictwo WNT, Warszawa 2017 r.

LEARNING OUTCOMES

- › **EU1** The student has theoretical knowledge of the basic groups of engineering materials, knows the basic technologies used in the production of engineering materials.
- › **EU2** The student is able to analyze the results of the research and prepare a report on selected laboratory exercises.

TEACHING TOOLS

- › Multimedia devices.
- › Teaching laboratories.
- › E-learning platform of the Częstochowa University of Technology or other distance learning tools.

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

- › **F1.** Assessment of reports on the implementation of selected laboratory exercises included in the curriculum.
- › **P1.** Assessment of the mastery of the teaching material being the subject of exercises - final test.

- › **P2.** Assessment of the mastery of the teaching material being the subject of the laboratory - final test.
- › **P3.** Assessment of the mastery of the teaching material being the subject of lectures - exam.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures	30	1,2
Seminar		
Classes	15	0,6
Laboratory	30	1,2
Project		
Test		
Exam	2	0,08
Total contact hours	77	3,08
Getting acquainted with the indicated literature	15	0,6
Preparation for seminar		
Preparation for classes	10	0,4
Preparation for lab	15	0,6
Project preparation		
Consultation	3	0,12
Preparation for the exam	30	1,2
Total student's own work	73	2,92
Total number of hours/ ECTS points for the course	150	6,0

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_W03, K_U04, K_U05, K_K02, K_K03,	C1, C2, C3	L1 - L8 Lab1 - Lab4 C1 – C5	P1, P2, P3
EU 2	K_W01, K_W03, K_U04, K_U05, K_K02, K_K03,	C1, C2, C3	Lab1 - Lab4	F1

FORM OF ASSESSMENT - DETAILS

EU1 The student has theoretical knowledge of the basic groups of engineering materials, knows the basic technologies used in the production of engineering materials.

- › 2,0 The student is not able to characterize the basic groups of engineering materials, does not know the basic technologies used for the production of engineering materials.
- › 3,0 The student is able to name and characterize the basic groups of engineering materials, is able to characterize in a basic way selected technologies used for the production of engineering materials.
- › 3,5 The student is able to name and characterize in a sufficient way and characterize the basic groups of engineering materials, is able to sufficiently plus characterize selected technologies used for the production of engineering materials.

- › 4,0 The student is able to name and characterize selected engineering materials in an in-depth manner, can characterize in an in-depth manner selected technologies used for the production of engineering materials.
- › 4,5 The student is able to name and characterize selected engineering materials in a good way, is able to characterize well selected technologies used for the production of engineering materials.
- › 5,0 The student is able to name and characterize in an in-depth and extended way selected engineering materials in terms of structure, manufacturing, can characterize in an in-depth and extended way the basic technologies used for the production of engineering materials.

EU2 The student is able to analyze the results of the research and prepare a report on selected laboratory exercises.

- › 2,0 The student is not able to prepare a report on the course of research.
- › 3,0 The student is able to prepare a report giving test results and calculations of individual properties as well as conduct a basic analysis of the test results.
- › 3,5 The student is able to prepare a report giving the test results and calculations of individual properties, as well as to perform sufficiently plus the analysis of the test results.
- › 4,0 The student is able to prepare a report on the conducted research and carry out an in-depth analysis of the research results.
- › 4,5 The student is able to prepare a report on the research carried out and perform a good analysis of the research results.
- › 5,0 The student is able to prepare a report on the conducted research and analyze the results of this research in an in-depth and extended way, and to formulate conclusions.

Polish course name	ZARZĄDZANIE JAKOŚCIĄ
English course name	QUALITY MANAGEMENT
Course code	WIP-MDL-D1-QM-02
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	2
Number of ECTS points	2
Ways of assessment	Test

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15		15		

TEACHERS:

Dr inż. Zbigniew Skuza,

Dr inż. Edyta Kardas,

Dr Agnieszka Bala - Litwiniak.

COURSE OBJECTIVES:

- › **C1** Provide students with knowledge of the basic issues of quality management.
- › **C2** To familiarize students with a selected group of methods and techniques of quality management - used to analyze and improve this system.
- › **C3** Acquisition by students of practical skills in the field of basic analysis and assessment of the quality management system.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Basic knowledge of mathematics.
2. Basic knowledge of organization and management.
3. Average mastery of data processing principles.
4. Ability to work independently and in a group.
5. Ability to use an engineering calculator.

COURSE CONTENT

LECTURE

- › **L1** Basic concepts and definitions in the field of quality management.
- › **L2** Theoretical foundations of quality management.
- › **L3** Motivating employees to raise the level of quality.
- › **L4** Quality management concepts.
- › **L5** TQM (Total Quality Management) - management philosophy.
- › **L6** Quality assurance in pre-production, production and post-production.
- › **L7, L8** Quality management systems. Integration of management systems
Quality management in various sectors.
- › **L9, L10** Quality management methods.
- › **L11, L12** Quality management tools and techniques.
- › **L13** Statistical quality control.
- › **L14** Methods of testing the quality of services.
- › **L15** Summary of the lectures.

CLASSES

- › **C1** Introduction to classes (discussion of the purpose and scope).
- › **C2, C3** FMEA – Failure Mode and Criticality Analysis.
- › **C4, C5** Pareto – Lorenz analysis.
- › **C6, C7** Analysis ABCD – Suzuki method.
- › **C8, C9** Analysis 5M.
- › **C10, C11** Ishikawa diagram.
- › **C12, C13** Shewhard's control cards.
- › **C14** Qualitative ability of the process, machines.
- › **C15** Summary of classes, final test.

BASIC REFERENCES

1. J. Łańcucki, D. Kowalska, J. Łuczak: Zarządzanie jakością w przedsiębiorstwie, Biblioteka Menedżera i Służby Pracowniczej, Bydgoszcz 1995 r.
2. M. Urbaniak: Zarządzanie jakością. Teoria i Praktyka, Difin, Warszawa 2004 r.
3. J. Łańcucki: Podstawy kompleksowego zarządzania jakością TQM, Akademia Ekonomiczna w Poznaniu, Poznań 2001 r.
4. E. Konarzewska-Gubała: Zarządzanie przez jakość: koncepcje, metody, studia przypadków, Wydawnictwo Uniwersytetu Ekonomicznego, Wrocław, 2013 r.

5. A. Hamrol, W. Mantura: Zarządzanie jakością. Teoria i praktyka, Wydawnictwo Naukowe PWN, Warszawa – Poznań 1998 r.
6. M. Stoma: Modele i metody pomiaru jakości usług, Q&R Polska Sp. zo. o., Lublin 2012 r.
7. A. Hamrol: Zarządzanie i inżynieria jakości, PWN, 2020 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. Z. Skuza, R. Prusak, R. Budzik: Contemporary Elements of Quality Management System in the Metallurgical Enterprise, Metalurgija, vol. 50, nr 2, p. 137-140, 2011 r.
2. Z. Skuza, T. Frączek, R. Prusak: FMEA Analysis of Logistic Processes in the Industrial Enterprise, Carpathian Logistics Congress 2018, p. 444-449, Czechy 2018 r.
3. E. Kardas: The Analysis of Qualitative Parameters of Anodised Coating of Finishing Strips, 27th International Conference on Metallurgy and Materials, 23 do 25 maja 2018 r., Brno, Czechy. Proceedings, 2018 r., pp. 2002-2007.
4. E. Kardas, P. Pustejovska, S. Brozova: Statistical Analysis of Quality Parameters of Pig Iron, System Safety: Human - Technical Facility - Environment (red.) Ulewicz Robert, Nikolic Ruzica R. Warszawa: De Gruyter Poland, 2019 r., pp. 616-623.

LEARNING OUTCOMES

- › **EU1** The student has a basic knowledge of quality management.
- › **EU2** The student knows the basic instruments for analyzing and improving the quality management system.

TEACHING TOOLS

- › Lecture with the use of audiovisual means.
- › Classes - solving problem tasks with the help of the teacher.
- › PCz e-learning platform.

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

- › **F1.** Assessment of activity during classes.
- › **F2.** Assessment of self-preparation for classes.

P1. Assessment of the mastery of the teaching material being the subject of exercises - final 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	2	0,08
Exam		
Total contact hours	32	1,28
Student's own work		
Getting acquainted with the indicated literature	5	0,2
Preparation for seminar		
Preparation for classes	5	0,2
Preparation for lab		
Project preparation		
Consultation	4	0,16
Preparation for the test	4	0,16
Total student's own work	18	0,72
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_W07,	C1	L1 - L15	F1
EU 2	K_U04,	C2, C3	C1 - C15	F2 P1

FORM OF ASSESSMENT - DETAILS

EU1 The student has a basic knowledge of quality management.

- › 2,0 The student has no basic knowledge of quality management.
- › 3,0 The student has some basic knowledge of quality management.
- › 3,5 The student has almost a basic knowledge of quality management.
- › 4,0 The student has a good basic knowledge of quality management.
- › 4,5 The student has an almost very good basic knowledge of quality management.
- › 5,0 The student has a very good basic knowledge of quality management.

EU2 The student knows the basic instruments for analyzing and improving the quality management system.

- › 2,0 The student does not know the basic instruments for analyzing and improving the quality management system.
- › 3,0 The student partially knows the basic instruments for analyzing and improving the quality management system.
- › 3,5 The student knows the basic instruments for analyzing and improving the quality management system.
- › 4,0 The student knows the basic instruments for analyzing and improving the quality management system well.
- › 4,5 The student knows almost very well the basic instruments for analyzing and improving the quality management system.
- › 5,0 The student knows the basic instruments for analyzing and improving the quality management system very well.

Polish course name	PODSTAWY PROJEKTOWANIA CAD
English course name	THE BASICS OF CAD DESIGN
Course code	WIP-MDL-D1-TBOCD-02
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	2
Number of ECTS points	2
Ways of assessment	Design work

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
				30

TEACHERS:

Dr inż. Andrzej Stefanik,

Dr hab. inż. Piotr Szota, prof. PCz.

COURSE OBJECTIVES:

- › **C1** Acquainting with the operation of CAD computer programs for drawing complex objects, material selection and basic property analysis based on metal processing processes.
- › **C2** Developing the ability to apply techniques and technologies for the visualization of machine parts and their interdependencies in the finished product assembly, as well as designing devices in space.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Basic knowledge of mathematics, metrology and computer science.
2. Ability to work independently and in a group.
3. Ability to use various sources of information.

COURSE CONTENT

DESIGN CLASSES

- › **P1, P2** Methods of volumetric and surface shaping.
- › **P3, P4** Finishing elements, parametric equations - variant designs.
- › **P5, P6** Assembly modeling - list of machine parts, types of connections.
- › **P7, P8** Drawing multi-element assemblies (assembly drawing) as a project using available database and design tools.
- › **P9, P10** Designing sheet metal parts and welded parts.
- › **P11, P12** The use of Inventor to design production tools.
- › **P13, P14** Load analysis of metal structures depending on the materials used.
- › **P15 – P30** Development of a project of a selected complex device, along with the selection of materials for production, strength analysis and technical documentation - hybrid work completed with a presentation of the project.

BASIC REFERENCES

1. Elżbieta Gąsiorek, Podstawy projektowania inżynierskiego, Wydawnictwo Uniwersytetu Ekonomicznego we Wrocławiu, 2006 r.
2. Fabian Stasiak, Zbiór ćwiczeń. Autodesk Inventor 2018, Kurs podstawowy, Expert Boks, 2018 r.
3. Thom Tremblay, Inventor 2014 and Inventor LT 2014 Essentials: Autodesk Official Press, John Wiley & Sons, 2013 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. Dobrzański Tadeusz, Rysunek techniczny maszynowy, Wydanie 24, WNT Warszawa, 2009 r.
2. Posiadała Bogdan, Rysunek techniczny w AutoCADzie, Wydawnictwo Politechniki Częstochowskiej, Częstochowa 2002 r.
3. Christian Schlieder, Autodesk Inventor 2010, Books on Demand, 2010 r.

LEARNING OUTCOMES

- › **EU1** Acquisition of theoretical and practical knowledge of modelling parts in spatial systems, including the use of IT tools, including basic knowledge of drawing parts, assemblies and preparing technical documentation.

- › **EU2** Ability to formulate specifications of simple engineering tasks and design a simple assembly of parts, object, system in 3D area, using appropriate methods, techniques and tools.

TEACHING TOOLS

- › Project - briefing with the use of multimedia devices.
- › Laboratory equipment and guides.
- › Computer stations with software.

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

- › **F1.** Assessment of the implementation of tasks included in the curriculum.
- › **P1.** Assessment of the mastery of the teaching material being the subject of project tasks - assessment of project preparation.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures	0	0
Seminar		
Classes		
Laboratory		
Project	30	1,2
Test	2	0,08
Exam		
Total contact hours	32	1,28
Student's own work		
Getting acquainted with the indicated literature		
Preparation for seminar		
Preparation for classes		
Preparation for lab		
Project preparation	14	0,56
Consultation	4	0,16
Preparation for the exam		
Total student's own work	18	0,72

Total number of hours/ ECTS points for the course	50	2,0
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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_W03, K_K02, K_U04,	C1	P1 - P14	F1, P1
EU 2	K_W03, K_K02, K_U04,	C2	P15 - P30	F1, P1

FORM OF ASSESSMENT - DETAILS

EU1 Acquisition of theoretical and practical knowledge of modelling parts in spatial systems, including the use of IT tools, including basic knowledge of drawing parts, assemblies and preparing technical documentation.

- › 2,0 The student has not mastered the knowledge of modelling parts in spatial systems, including the use of IT tools, including basic knowledge of making a drawing of a part, a team and preparation of documentation.
- › 3,0 The student has mastered the basic knowledge of modelling parts in spatial systems, including the use of IT tools, including basic knowledge of drawing a part, assembly and preparation of technical documentation.
- › 3,5 The student has partially mastered the knowledge of modelling parts in spatial systems, including the use of IT tools, including basic knowledge of making a drawing of a part, assembly and preparation of technical documentation.

- › 4,0 The student has a good command of the knowledge of modelling parts in spatial systems, including the use of IT tools, including basic knowledge of making a drawing of a part, assembly and preparation of technical documentation.
- › 4,5 The student has more than a good command of the knowledge of modelling parts in spatial systems, including the use of IT tools, including basic knowledge of making a drawing of a part, assembly and preparation of technical documentation.
- › 5,0 The student has a very good command of the knowledge of modelling parts in spatial systems, including the use of IT tools, including basic knowledge of making a drawing of a part, assembly and preparation of technical documentation.

EU2 Ability to formulate specifications of simple engineering tasks and design a simple assembly of parts, object, system in 3D area, using appropriate methods, techniques and tools.

- › 2,0 The student does not have the ability to perform the specifications of simple engineering tasks and design simple assemblies of parts, objects, systems in the 3D area, using appropriate methods, techniques and tools.
- › 3,0 The student has the basic implementation of the specification of simple engineering tasks and the design of simple assemblies of parts, objects, systems in the 3D area, using the appropriate methods, techniques and tools.
- › 3,5 The student has partial skills to perform the specifications of simple engineering tasks and to design simple assemblies of parts, objects, systems in the 3D area, using appropriate methods, techniques and tools.
- › 4,0 The student is able to perform the specification of simple engineering tasks well and to design a simple assembly of parts, objects, systems in the 3D area, using appropriate methods, techniques and tools.
- › 4,5 The student is more than able to perform the specification of simple engineering tasks and design a simple assembly of parts, objects, systems in the 3D area, using the appropriate methods, techniques and tools.
- › 5,0 The student is very good at specifying simple engineering tasks and designing a simple assembly of parts, objects, systems in the 3D area, using appropriate methods, techniques and tools.

Polish course name	PODSTAWY TOWAROZNAWSTWA
English course name	BASICS OF COMMODITY SCIENCE
Course code	WIP-MDL-D1-BOCS-02
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	2
Number of ECTS points	3
Ways of assessment	Test

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15		15		

TEACHERS:

Dr inż. Anna Zawada.

COURSE OBJECTIVES:

- › **C1** Provide students with knowledge of the basics of commodity science.
- › **C2** Introducing the students to the issues related to commodity science: genesis, nomenclature, outline of the technological process, shaping and assessment of quality.
- › **C3** Obtaining by the students the practical skills in the field of certification, classification, standardization and product quality assessment.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Basic knowledge of chemistry, physics and mathematics.
2. Having the ability to use various sources of information, incl. technical documentation and manuals,

3. Ability to work independently and in a group.

COURSE CONTENT

LECTURE

- › **L1** Commodity science as a scientific discipline. Commodities and their classification.
- › **L2** Commodity classification systems: world, European and Polish classification.
- › **L3** Standardization and its importance on the goods market.
- › **L4, L5** Commodity science of industrial products.
- › **L6, L7** Commodity science of food products.
- › **L8, L9** Packaging in logistic systems.
- › **L10** Automatic identification of goods - barcodes and RFID systems.
- › **L11, L12** Factors influencing the quality of goods. Methods of assessing the quality of goods: sensory analysis, consumer evaluation methods, laboratory methods.
- › **L13, L14** Food safety systems (GMP/GHP, ISO 22000, HACCP). Standardization, accreditation, certification and their importance in the goods market.
- › **L15** Goods in the process of transport.

CLASSES

- › **C1, C2** Characteristics of selected product groups.
- › **C3, C4** Technologies for the production of metal materials.
- › **C5, C6** Technologies for the production of ceramic materials.
- › **C7, C8** Technologies for the production of polymeric materials.
- › **C9, C10** Methods of structural research of industrial materials.
- › **C11, C12** Methods for testing the mechanical properties of industrial materials.
- › **C13, C14** The essence and scope of goods standardization, basic documentation.
- › **C15** Final test.

BASIC REFERENCES

1. Beata Zembrzuska. Towaroznawstwo. Warszawa, Wydaw. Difin, 2010 r.

2. Karpień Ł., Skrzypek M. Towaroznawstwo ogólne. Wyd. AE, Kraków 2000 r.
3. Jałowicz T. (red.). Towaroznawstwo dla logistyki. Difin SA, Warszawa 2011 r.
4. Lisińska-Kuśnierz M., Ucherek M. Opakowania w ochronie konsumenta. Wyd. AE, Kraków 2006 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. Dobrzański L.A. Materiały inżynierskie i projektowanie materiałowe. Podstawy nauki o materiałach i metaloznawstwo. WNT, Warszawa 2006 r.
2. Korzeniowski A. Towaroznawstwo artykułów przemysłowych. Badanie jakości wyrobów. AE, Poznań 1999 r.
3. Korzeniowski A. Towaroznawstwo opakowań. AE, Poznań 1994 r.
4. Buciewicz J., Hornik S., Ostrowski A. Towaroznawstwo przemysłowe. Towary metalowe. Wyd. AE w Krakowie, Kraków 1989 r.

LEARNING OUTCOMES

- › **EU1** Student has basic theoretical knowledge in the field of commodity science.
- › **EU2** Student is able to use the research techniques and analyse the properties of industrial materials.

TEACHING TOOLS

- › Multimedia presentations.
- › Manuals, scripts.
- › Laboratory equipment and guides.
- › CUT e-learning platform (possible use).

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

- › **F1.** Assessment of the implementation of tasks included in the curriculum.
- › **F2.** Assessment of the mastery of the teaching material being the subject of exercise tasks - final test.
- › **P1.** Assessment of the mastery of the didactic material within the lectures - final test.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
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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	13	0,52
Preparation for lab		
Project preparation		
Consultation	4	0,16
Preparation for the test	10	0,4
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	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	Course objectives	Course content	Ways of assessment
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	outcomes defined for whole program			
EU 1	K_W01, K_W04, K_U04, K_U08, K_K01,	C1, C2	L1 - L15	P1
EU 2	K_W01, K_W04, K_U04, K_U08, K_K01,	C2, C3	C1 - C15	F1, F2

FORM OF ASSESSMENT - DETAILS

EU1 Student has basic theoretical knowledge in the field of commodity science.

- › 2,0 Student does not know the basic issues of commodity science.
- › 3,0 Student partially knows the basic issues of commodity science.
- › 3,5 Student almost knows the basic issues in the field of commodity science.
- › 4,0 Student knows the basic issues of commodity science well.
- › 4,5 Student shows almost very good knowledge of the basic issues in the field of commodity science.
- › 5,0 Student knows the basic issues of commodity science very well.

EU2 Student is able to use the research techniques and analyse the properties of industrial materials.

- › 2,0 Student is not able to choose the research technique and independently analyse the properties of industrial commodities.
- › 3,0 Student is able to partially select research techniques and independently analyse the properties of industrial commodities.
- › 3,5 Student can almost select research techniques and independently analyse the properties of industrial commodities.
- › 4,0 Student is able to select research techniques well and independently analyse the properties of industrial commodities.
- › 4,5 Student is able to choose the research techniques very well and independently analyse the properties of industrial commodities.
- › 5,0 Student selects research techniques very well and independently analyse the properties of industrial commodities.

Polish course name	WYCHOWANIE FIZYCZNE I
English course name	PHYSICAL EDUCATION I
Course code	WIP-MDL-D1-PE-02
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	2
Number of ECTS points	0
Ways of assessment	Credit

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
		30		

TEACHERS:

Mgr Maciej Żyła,

Mgr Dariusz Parkitny,

Mgr Agnieszka Krzyszkowska-Zalejska,

Dr Waldemar Różycki,

Mgr Piotr Pawłowski.

COURSE OBJECTIVES:

C1 Shaping and improving comprehensive physical development through the appropriate selection of training measures appearing in the structure of the selected sports discipline. Shaping pro-health attitudes among students of the Częstochowa University of Technology.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

There are no contraindications to participate in physical education classes.

COURSE CONTENT (Dean's groups are assigned to a specific discipline by the WFiS Study Management).

CLASSES (team games)

Volleyball

- › **C1** Organizational classes.
- › **C2** Volleyball warm-up, high and low posture.
- › **C3** Improving the ways of moving around the pitch.
- › **C4, C5** Improving the bounce of the ball with both hands, up and down.
- › **C6** Improving the tennis, gliding game.
- › **C7** Improving the reception of the serve in the lower and upper way to zone 0.
- › **C8, C9** Improving attack from zones: 2,3,4.
- › **C10** Improving Pledge (Block): Single.
- › **C11 - C14** A simplified game, a school game, a proper game.
- › **C15** Credits.

Basketball

- › **C1** Organizational classes.
- › **C2** Diagnostics of the technical skills of the game.
- › **C3, C4** Teaching ways to move around the pitch, moving with the ball in the goat, trying to play games 1x1.
- › **C5 - C7** Teaching/improving dribbling: isolation, walking, jogging, running. 1x1 game.
- › **C8 - C10** Teaching/ improving passes and throws. Passing in place on the move. A throw from the place, after the kid, after passing the partner. Two-track throw. Trials of 2x2 games.
- › **C11 - C14** Improving basic technical skills learned in class. 3x3 tournament - streetball: rules, regulations, game system.
- › **C15** Credits.

Football

- › **C1** Organizational classes.
- › **C2** Diagnostics of technical skills.
- › **C3, C4** Improving ball handling with a change of direction and pace. School game.
- › **C5, C6** Improving ball hitting with foot and head. School game.
- › **C7, C8** Improving ball receptions. School game.
- › **C9 - C11** Improving shots on goal. The game proper.
- › **C12 - C14** Indoor football tournament - 5-person teams.

- › **C15** Credits.

Classes (individual sports)

Functional training

- › **C1** Organizational classes.
- › **C2** Theory: An Introduction to TF. Practice: FMS functional assessment - selected tests.
- › **C3, C4** Reducation of erroneous movement patterns. Prehab - an exercise focused on injury prevention.
- › **C5 - C7** Preparation for movement, prehab, shaping central stability.
- › **C8 - C10** Preparation for movement, prehab, core, shaping cardiovascular and respiratory endurance, regeneration - fascial techniques.
- › **C11, C12** Preparation for movement, core, shaping cardiovascular and respiratory endurance, regeneration - comprehensive stretching.
- › **C13, C14** Preparation for movement, core, flexibility - plajometrics, cardiovascular and respiratory endurance, regeneration - fascial techniques.
- › **C15** Final classes.

Health training

- › **C1** Organizational classes.
- › **C2** Theoretical and practical classes: introduction to TZ, preparation for movement, TA Schultz's concept - heaviness, warmth.
- › **C3 - C5** Shaping the proper mobility in the joints (mobility), introducing rollers to relax the muscles before stretching. TA- introduction of the full range of training- learning to listen to your own body.
- › **C6 - C9** Shaping mobility, introducing stabilization exercises (board), in various starting positions. Developing exercises on rollers - introducing rubbing to increase the effect of relaxation. Comprehensive stretching - aimed at stretching (within the individual limits of the muscles). TA- full range of training.
- › **C10 - C14** Preparation for movement, strengthening of postural muscles, comprehensive rolling, fascial stretching. TA- full range of training.
- › **C15** Final classes.

Fitness/pilates

- › **C1** Organizational classes.

- › **C2** Basic exercises to strengthen the "hoop of strength", that is the abdominal muscles, buttocks and the broadest muscles of the back. Introduction to exercises in the Pilates technique.
- › **C3** Exercises for the lats and torso muscles - the technique of performing these exercises and learning how to breathe properly. Stretching and relaxing exercises.
- › **C4** Arms and Upper Body - Strengthening and stretching and the ability to relax your upper body.
- › **C5** Pilates exercises - entering the first level - exercises to strengthen the back and abdominal muscles.
- › **C6** Strengthening the "central rim" through precise selection of exercises continuation of the first level.
- › **C7** Strengthening and stretching the legs - from buttocks to feet. Control over the care of maintaining the proper body system - level one.
- › **C8** Strengthening arm exercises. Relaxation of all the muscles of the "middle girdle" - level one.
- › **C9** Introducing Pilates exercises to the second level by developing exercises from the first level.
- › **C10** Relaxing your upper body and stretching at the same time with a fit ball. Running the sacral area - second level.
- › **C11** Strengthening the "middle rim" and legs with weights - second level.
- › **C12** Strengthening arms and back with utensils - sticks, weights.
- › **C13** Level Three Pilates - continuing to strengthen the muscles, especially the "middle girdle". Coordination of movements in more complex exercises.
- › **C14** Applying advanced exercises to the abdominal and leg muscles coming from level three.
- › **C15** Final classes.

Table Tennis

- › **C1** Organizational classes.
- › **C2** Diagnostics of the technical skills of the game.
- › **C3** Starting position and basic rules of moving around the table. Singles game.
- › **C4 - C5** Diagonal stroke versus forehand, singles gametime for points.

- › **C6 - C8** Strokes versus forehand and backhand diagonally, plays for points with alternating exercisers at the tables.
- › **C9 - C11** Improving known strokes, straight strokes, emphasis on the work of the legs at the table. Game for points with a change of practitioners.
- › **C12 - C14** Individual tournament - everyone's game.
- › **C15** Credits.

Swimming (activities only if the facility is rented)

- › **C1** Organizational classes. Occupational health and safety training, familiarization with the swimming pool regulations, study regulations, organization during classes - course of classes.
- › **C2** Getting accustomed to the water environment, spreading backstroke, crawl on the chest, classic, 25m each. Assessment of the group's swimming technique. Exhausts to the water at the wall, 5 exhalations.
- › **C3 - C5** Teaching backstroke (correct technique).
- › **C6 - C8** Teaching breast crawl style (correct technique).
- › **C9 - C11** Teaching classical style (correct technique).
- › **C12 - C14** Improving swimming techniques in the following styles: back, chest crawl, classic.
- › **C15** Final classes.

Gym (classes only if the facility is rented)

- › **C1** Organizational classes.
- › **C2** Acquainting students with the facility, the introductory part is carried out in the fitness room. Overview of the functioning of the gym equipment.
- › **C3 - C7** Anatomical muscle adaptation. Preparation for exercise - fitness room: raising the body temperature, dynamic stretching, mobilization exercises preparing for strength training. Moving to the gym: strength training - the FBW principle (full body workout), oxygen training - based on cross trainers, treadmills, bikes, steppers - continuous efforts with an intensity of about 60% HRmax.
- › **C8 - C11** Muscular endurance. Preparation for movement - fitness room: steps, dynamic stretching, strengthening exercises with the use of dumbbells and fit ball, exercises for central stabilization. Moving to the gym: strength training - muscle endurance of large muscle groups, the number of repetitions from 12 to

16 in a series, oxygen training - based on cross trainers, treadmills, bikes, steppers - mixed efforts similar to interval exercises, heart rate depending on individual exercise capacity.

- › **C12 - C14** Training based on the training programs of the tutor or attempts to introduce individual training programs that must be approved by the tutor. Preparation for movement - fitness room: steps, dynamic stretching, strengthening exercises using the weight of your body, exercises for central stabilization. Transition to the gym - strength training, oxygen training - attempts to introduce hybrid training 5 min cross trainers / training circuit for large muscle groups 4 exercises.
- › **C15** Final classes.

Tennis/Beach Tennis

- › **C1** Organizational classes.
- › **C2** Teaching forehand, tennis games and activities.
- › **C3** Teaching ambidextrous backhand strokes, tennis games and fun.
- › **C4** Teaching flat service, school game - doubles.
- › **C5** Teaching the base position in beach tennis, ways of moving around the court.
- › **C6** Teaching bounce, forehand / backhand, moving around the net.
- › **C7** Doubles tournament - tennis.
- › **C8** Doubles tournament - beach tennis.
- › **C9** Final classes.

BASIC REFERENCES

1. A. Zając, Współczesny trening siły mięśniowej. Katowice 2010 r.
2. Cz. Sieniak, Zasób ćwiczeń technicznych z zakresu koszykówki, piłki ręcznej, siatkówki i piłki nożnej dla celów dydaktycznych. Starachowice 2012 r.
3. G. Grządziel, W. Ljach, Piłka siatkowa: podstawy treningu, zasób ćwiczeń. Warszawa 2000 r.
4. J. P. Clemenceau, F. Delavier, M. Gundill, Stretching. Warszawa 2012 r.
5. M. Gundill, F. Delavier, Modelowanie sylwetki metodą Delaviera. Warszawa 2011 r.
6. P. Szeligowski, Trening siły eksplozywnej w sportach walki. Łódź 2012 r.
7. R. Biernat, strategia zapobiegania urazom w siatkówce. Olsztyn 2010 r.

8. R. Kulgawczuk, Nauczanie i uczenie się gry w siatkówkę. Szczecin 2012 r.
9. Z. Zatyrcz, L. Piasecki : Piłka siatkowa, Szczecin 2000 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. D. Farhi, The Breathing Book, New York USA - 2003 r.
2. J. Bookspan, The AB Revolution Fourth Edition, Milton Keynes UK - 2015 r.

LEARNING OUTCOMES

- › **EU1** The student knows the theoretical foundations of the selected sports discipline.
- › **EU2** The student is able to perform the basic technical elements of the selected discipline.
- › **EU3** The student is able to cooperate in: a couple, a group, a team, observes the rules of fair-play.

TEACHING TOOLS

- › Balls, mattresses, gymnastic benches, cones, teraband rubber, rollers.
- › E-learning platform of the Częstochowa University of Technology, or other distance learning tools Multimedia presentations.

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

- › **F1.** Assessment of commitment during the course.
- › **F2.** Technical assessment of the correctness of the exercises performed.
- › **P1.** Credit based on attendance.
- › **P2.** Credit based on activity in the classroom.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures		
Seminar		
Classes	30	0
Laboratory		
Project		

Test		
Exam		
Total contact hours	30	0
Student's own work		
Getting acquainted with the indicated literature		
Preparation for seminar		
Preparation for classes		
Preparation for lab		
Project preparation		
Consultation		
Preparation for the exam		
Total student's own work		
Total number of hours/ ECTS points for the course	30	0

ADDITIONAL INFORMATION

Timetable of classes	https://swfis.pcz.pl/menu/student---niezbedne-informacje
Information about the consultation (time + place)	https://swfis.pcz.pl/menu/student---niezbedne-informacje

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_K01,	C1	C1 - C15	F1, F2, P1, P2
EU 2	K_U02, K_K01,	C1	C1 - C15	F1, F2, P1, P2
EU 3	K_U02, K_K01,	C1	C1 - C15	F1, F2, P1, P2

FORM OF ASSESSMENT - DETAILS

EU1 The student knows the theoretical foundations of the selected sports discipline.

- › 2,0 The student does not know the basic rules of the selected sports discipline. He does not systematically participate in classes.
- › 3,0 The student partially knows the basic rules of the selected sports discipline. Participates systematically in classes.
- › 3,5 The student knows the basic rules of the chosen sport discipline. Participates systematically in classes.
- › 4,0 The student knows the basic rules of the selected sport discipline well. Participates systematically in classes.
- › 4,5 Student almost very well knows the basic rules of the chosen sports discipline. Participates systematically in classes.
- › 5,0 The student knows the basic rules of the chosen sport very well. Participates systematically in classes.

EU2 The student is able to perform the basic technical elements of the selected discipline.

- › 2,0 The student is not able to perform the basic technical elements of the selected discipline. He does not systematically participate in classes.
- › 3,0 The student is able to partially perform the basic technical elements of the selected discipline. Participates systematically in classes.
- › 3,5 The student can almost perform the basic technical elements of the selected discipline. Participates systematically in classes.
- › 4,0 The student is able to perform the basic technical elements of the selected discipline well. Participates systematically in classes.
- › 4,5 The student is able to perform the basic technical elements of the chosen discipline almost very well. Participates systematically in classes.
- › 5,0 The student is able to perform very well the basic technical elements of the selected discipline. Participates systematically in classes.

EU 3 The student is able to cooperate in: a couple, a group, a team, observes the rules of fair-play.

- › 2,0 The student is not able to cooperate in: a couple, a group, a team, observes the rules of fair-play. He does not systematically participate in classes.

- › 3,0 The student is able to partially cooperate in: a couple, a group, a team, he observes the rules of fair-play. Participates systematically in classes.
- › 3,5 The student can almost cooperate in: a couple, a group, a team, he observes the rules of fair play. Participates systematically in classes.
- › 4,0 The student is able to cooperate well in: a couple, a group, a team, observes the rules of fair-play. Participates systematically in classes.
- › 4,5 The student is able to cooperate very well in: a couple, a group, a team, he observes the rules of fair play. Participates systematically in classes.
- › 5,0 The student is able to cooperate very well in: a couple, a group, a team, observes the rules of fair-play. Participates systematically in classes.

Polish course name	MATEMATYKA
English course name	MATHEMATICS
Course code	WIP-MDL-D1-MAT-02
Field of study	Material design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	2
Number of ECTS points	3
Ways of assessment	Exam

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15		15		

TEACHERS:

Dr inż. Anita Ciekot,

Dr Sylwia Lara-Dziembek.

COURSE OBJECTIVES:

- › **C1** Making the students familiar with the basic elements of complex number and practical skills to solve typical problems being the subject of the lecture.
- › **C2** Acquaint students with the basic concepts of matrix theory and determinants and practical skills to solve the typical problems being the subject of the lecture.
- › **C3** Making the students familiar with elements of the systems of linear equations and practical skills to solve typical problems being the subject of the lecture.
- › **C4** Making the students familiar with the basic elements of analytic geometry in space and practical skills to solve typical problems being the subject of the lecture.
- › **C5** Making the students familiar with the basic concepts of differential and integral calculus for functions of a two variable and practical skills to solve typical problems being the subject of the lecture.
- › **C6** Making the students familiar with the selected types of ordinary differential equations and practical skills to solve typical problems being the subject of the lecture.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Knowledge of basic high school algebra and mathematical analysis.
2. Ability to solve elementary problems of algebra and mathematical analysis.
3. Ability to work independently and in group.
4. Ability to use different sources of information.

COURSE CONTENT

LECTURE

- › **L1, L2** The set of complex number – basic definitions, theorems, properties, elementary operations, algebraic and trigonometric form of complex number.
- › **L3, L4** Matrices and determinants – basic definitions, properties, theorems, basic operations with matrices, inverse matrix, the matrix – vector equation.
- › **L5, L6** The systems of linear equations – basic definitions, the Cramer rule, the Gaussian elimination.
- › **L7, L8** Analytic geometry in space – scalar product, cross product, scalar triple product and its geometrical interpretation. Line and plane in space.
- › **L9, L10** Function of two variables – definition, domain, partial derivatives, minima and maxima for function of two variables, total differential.
- › **L11 – L13** Integral calculus for the function of two variables, the y – and x – simple regions, polar coordinates, change of variables, applications in geometry.
- › **L14, L15** Ordinary differential equations – the selected types of ordinary differential equations.

CLASSES

- › **C1, C2** Elementary operations of complex numbers in algebraic and trigonometric form. Solving equations in the complex domain.
- › **C3, C4** Quiz 1. Operations with matrices, calculating determinants of any degree, inverse matrices, solving matrix equations.
- › **C5, C6** Quiz 2. Solving systems of linear equations using the Cramer rule and Gaussian elimination.

- › **C7, C8** Quiz 3. Calculating scalar product, cross product, scalar triple product and their geometrical application. Determining the equations of a line and a plane in space.
- › **C9, C10** Quiz 4. Determining the domain of the function of two variables, Computing the partial derivatives, determining the minima and maxima for the function of two variables.
- › **C11 – C13** Quiz 5. Computing the double integral over the y – and x – simple regions, application of polar coordinates, applications in geometry.
- › **C14** Quiz 6. Solving the selected types of ordinary differential equations.
- › **C15** Final test.

BASIC REFERENCES

1. Gewert M., Skoczylas Z., Analiza matematyczna 2, Definicje, twierdzenia wzory, Oficyna Wydawnicza GiS, Wrocław 2019 r.
2. Gewert M., Skoczylas Z., Analiza matematyczna 2, Przykłady i zadania, Oficyna Wydawnicza GiS, Wrocław 2019 r.
3. Krysicki W., Włodarski L., Analiza matematyczna w zadaniach, PWN, Warszawa, 2019 r.
4. Jurlewicz T., Skoczylas Z.: Algebra liniowa cz. I., Definicje twierdzenia, wzory, Oficyna Wydawnicza GiS, Wrocław 2008 r.
5. Jurlewicz T., Skoczylas Z.: Algebra liniowa cz. I., Przykłady i zadania, Oficyna Wydawnicza GiS, Wrocław 2008 r.
6. Gewert M., Skoczylas Z., Równania różniczkowe zwyczajne, Oficyna Wydawnicza GiS, Wrocław 2016 r.
7. Matwiejew N.M., Zadania z równań różniczkowych zwyczajnych, PWN Warszawa 1997 r.
8. Elementy matematyki wyższej. Zadania z rozwiązaniami. Część 2, skrypt pod redakcją A. Ciekot, Wydawnictwo Politechniki Częstochowskiej, Częstochowa, 2021 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. Leja F., Rachunek różniczkowy i całkowy, PWN, Warszawa, 2021 r.
2. Fichtenholz G.M., Rachunek różniczkowy i całkowy, PWN, Warszawa, 2009 r.

3. Stankiewicz W., Zadania z matematyki dla wyższych uczelni technicznych, PWN, Warszawa, 2020 r.
4. Mostowski A., Stark M., Elementy algebry wyższej, PWN, Warszawa 1975 r.
5. Klukowski J., Nabiałek I., Algebra dla studentów, WNT Warszawa 2012 r.
6. Żółtowska E., Porazińska E., Żółtowski J., Algebra liniowa, Absolwent, Łódź 2007 r.

LEARNING OUTCOMES

- › **EU1** The student has basic theoretical knowledge of the content presented in the lectures: selected problems of linear algebra, differential and integral calculus for the function of two variables, selected types of ordinary differential equations.
- › **EU2** The student is able to solve the selected problems of linear algebra, differential and integral calculus for the function of two variables, selected types of ordinary differential equations.

TEACHING TOOLS

- › Lectures using multimedia presentations.
- › Traditional face-to-face, blackboard supported tutorials.
- › Lecture notes.
- › Problem sets for students.
- › CUT e-learning platform (possible use).

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

- › **F1.** Assessment of preparation for classes (during tutorials).
- › **F2.** Assessment of student's activity (during all types of classes).
- › **P1.** Assessment of mastery of the tutorials material – quizzes, achievement test.
- › **P2.** Assessment of mastery of the lecture material – passing the lecture (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	4	0,16
Total contact hours	34	1,36
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	2	0,08
Preparation for the exam	9	0,36
Total student's own work	41	1,64
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://km.pcz.pl/news.php

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_K02,	C1 - C6	L1 - L15	F2, P2
EU 2	K_W01, K_U01 K_K02,	C1 - C6	C1 - C15	F1, F2, P1

FORM OF ASSESSMENT - DETAILS

EU1 The student has basic theoretical knowledge of the content presented in the lectures: selected problems of linear algebra, differential and integral calculus for the function of two variables, selected types of ordinary differential equations.

- › 2,0 The student lacks knowledge of the basic definitions and theorems connected with selected problems of linear algebra, differential and integral calculus for the function of two variables, selected types of ordinary differential equations.
- › 3,0 The student has sufficient knowledge of the definitions and theorems given in the lectures: selected problems of linear algebra, differential and integral calculus for the function of two variables, selected types of ordinary differential equations.
- › 3,5 The student has mastered the knowledge of the subject for grade 3,0 but has not mastered the knowledge of the subject for grade 4,0.
- › 4,0 The student knows most of the basic definitions and theorems connected with selected problems of linear algebra, differential and integral calculus for the function of two variables, selected types of ordinary differential equations.
- › 4,5 The student has mastered the knowledge of the subject for grade 4,0 but has not mastered the knowledge of the subject for grade 5,0.
- › 5,0 The student knows all the definitions, and theorems connected with selected problems of linear algebra, differential and integral calculus for the function of two variables, selected types of ordinary differential equations.

EU2 The student is able to solve the selected problems of linear algebra, differential and integral calculus for the function of two variables, selected types of ordinary differential equations.

- › 2,0 The student is unable to apply the knowledge learned to solve problems of selected problems of linear algebra, differential and integral calculus for the function of two variables, selected types of ordinary differential equations.
- › 3,0 The student is partially able to apply the knowledge learned to solve problems of selected problems of linear algebra, differential and integral calculus for the function of two variables, selected types of ordinary differential equations. The student uses the indicated methods in solving elementary tasks, but the result of his work has slight calculation errors.

- › 3,5 The student has mastered the knowledge of the subject for grade 3,0 but has not mastered the knowledge of the subject for grade 4,0.
- › 4,0 The student is well able to apply the knowledge learned to solve tasks on selected problems of linear algebra, differential and integral calculus for the function of two variables, selected types of ordinary differential equations. The student is able to use all the methods learned to solve a variety of tasks.
- › 4,5 The student has mastered the knowledge of the subject for grade 4,0 but has not mastered the knowledge of the subject for grade 5,0.
- › 5,0 The student is very well able to apply the knowledge of the content presented in the lectures to solve tasks on selected problems of linear algebra, differential and integral calculus for the function of two variables, selected types of ordinary differential equations. The student is able to appropriately choose a method for solving the task, justify the correctness of the choice and discuss the results.

Polish course name	KOMUNIKACJA SPOŁECZNA I NEGOCJACJE
English course name	SOCIAL COMMUNICATION AND NEGOTIATIONS
Course code	WIP-MDL-D1-SCAN-02
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	2
Number of ECTS points	2
Ways of assessment	Test

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15		15		

TEACHERS:

Dr inż. Monika Górską,

Dr inż. Jarosław Boryca,

Dr inż. Ewa Staniewska.

COURSE OBJECTIVES:

- › **C1** To acquaint students with the basic concepts and models of communication.
- › **C2** To acquaint students with the basic concepts and models of communication.

**PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER
COMPETENCES:**

1. The student knows the basics of management, knows the basics of marketing
2. Ability to work independently and in a group.
3. Ability to use literature sources and internet resources.

COURSE CONTENT

LECTURE

- › **L1, L2** Social communication.
- › **L3, L4** Means and forms of communication.
- › **L5, L6** Models of the communication process.
- › **L7** Obstacles to effective communication.
- › **L8, L9** Principles and types of negotiation.
- › **L10, L11** Stages of negotiation.
- › **L12, L13** Breaking down barriers to negotiation.
- › **L14** Intercultural negotiations.
- › **L15** Completion of the course.

CLASSES

- › **C1** Verbal communication, non-verbal communication.
- › **C2** Psychological aspects of communication.
- › **C3** Counter-argumentation methods.
- › **C4 - 7** Body language.
- › **C8** Public appearances.
- › **C9** Attitudes in negotiations.
- › **C10** The Harvard model of negotiation.
- › **C11** Negotiation tactics.

BASIC REFERENCES

1. Goban –Klas T.: Media i komunikowanie masowe. Teorie i analizy prasy, radia, telewizji i internetu, Wydawnictwo Naukowe PWN Warszawa, Kraków 2002 r.
2. Robbins S. P.: Zachowania w organizacjach, Polskie Wydawnictwo Ekonomiczne, Warszawa 2004 r.
3. Baklarski K.: Negocjacje, Collegium Bobolanum, Warszawa 2012 r.
4. Kulawik A.: Strategie i taktyki negocjacyjne na arenie międzynarodowej, Wydawnictwo e-bookowo.pl, 2001 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. Pase A., B.: Mowa ciała, Dom Wydawniczy REBIS, Poznań 2007 r.

LEARNING OUTCOMES

- › **EU1** The student knows and understands the basic concepts and models of communication.
- › **EU2** The student has knowledge of the negotiation process and rules of its conduct.

TEACHING TOOLS

- › Multimedia presentations.
- › CUT e-learning platform (possible use).
- › Computer stations with software.

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

- › **F1.** Assessment of self-preparation for exercises.
- › **P1.** Final 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	2	0,08
Exam		
Total contact hours	32	1,28
Student's own work		
Getting acquainted with the indicated literature	5	0,2
Preparation for seminar		
Preparation for classes	4	0,16
Preparation for lab		
Project preparation		
Consultation	3	0,12

Preparation for the test	6	0,24
Total student's own work	18	0,72
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_W07, K_K03,	C1	L1 - L15	P1
EU 2	K_W07, K_U07, K_K03,	C2	C1 - C11	F1

FORM OF ASSESSMENT - DETAILS

EU1 The student knows and understands the basic concepts and models of communication.

- › 2,0 The student does not know the basic concepts of communication.
- › 3,0 The student has a basic knowledge of the concepts of communication.
- › 3,5 The student has mastered the basic knowledge of the concepts of communication sufficiently plus.
- › 4,0 The student has knowledge of the concepts of communication.
- › 4,5 The student has mastered the basic knowledge of the concepts of communication with a good plus degree.
- › 5,0 The student has a significant knowledge of the concepts of communication

EU2 The student has knowledge of the theory of negotiation and the rules of its conduct.

- › 2,0 The student has no knowledge of the theory of negotiation.
- › 3,0 The student has partial knowledge of the theory of negotiation.
- › 3,5 The student has mastered the knowledge of negotiation theory sufficiently plus.
- › 4,0 The student has knowledge of the theory of negotiation.
- › 4,5 The student has a good knowledge of the theory of negotiation plus.
- › 5,0 The student has a significant knowledge of the theory of negotiation.

Polish course name	MATERIAŁY DLA PRZEMYSŁU ELEKTRONICZNEGO
English course name	MATERIALS FOR THE ELECTRONICS INDUSTRY
Course code	WIP-MDL-D1-MFTEI-02
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	2
Number of ECTS points	2
Ways of assessment	Test

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15			15	

TEACHERS:

Dr inż. Marcin Jarosik.

COURSE OBJECTIVES:

- › **C1** Providing students with knowledge in the field of materials used in the electronics industry, including their properties and applications.
- › **C2** Obtaining by the students the practical skills in testing selected properties of materials used in the electronics industry.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Basic knowledge of mathematical analysis and physics, in particular in the "Electricity and Magnetism" section.
2. Ability to work independently and in a group.
3. Ability to use literature sources and internet resources.

COURSE CONTENT

LECTURE

- › **L1 - L3** Introduction to electronic materials science: structure of matter, typical processing and manufacturing of electronic components, properties of materials and methods of their testing.
- › **L4 - L6** Conductive materials: electric conductivity of metals, wire materials, resistive materials, contact materials, special conductive materials.
- › **L7** Cryoresistivity, superconductivity and superconducting materials.
- › **L8 - L10** Semiconductor materials: properties and application of semiconductors. Manufacture of semiconductor materials.
- › **L11 - L13** Dielectric materials: structure and properties of dielectrics, types and applications of dielectrics.
- › **L14** Liquid crystal materials: structure, properties and applications.
- › **L15** Final test.

LABORATORY

- › **Lab1** The Workshop Regulations and OHS Regulations, determination of measurement uncertainties.
- › **Lab2 - Lab14** The student performs 6 designated exercises from the list:
 1. Determination of the characteristics and static parameters of the transistor.
 2. Marking of the Fe-Mo thermocouple and determining the point of inversion.
 3. Examination of the LED diode's and the laser diode's characteristics.
 4. Measurement of the width of the energy gap in semiconductors.
 5. Characteristics of resistances.
 6. Testing the electrical strength of materials; breakdown voltage measurement.
- › **Lab15** Completion of the laboratory.

BASIC REFERENCES

1. Zdzisław Celiński, Materiałoznawstwo elektrotechniczne. Warszawa: Wydaw. Politechniki Warszawskiej, 2011 r.
2. Andrzej Szwedowski, Materiałoznawstwo optyczne i optoelektroniczne: ogólne właściwości materiałów. Warszawa: Wydaw. Nauk.-Techn., 1996 r.
3. Małgorzata Jakubowska, Techniki drukarskie w elektronice: materiały i technologie. Warszawa: Oficyna Wydaw. Politechniki Warszawskiej, 2013 r.

4. Krzysztof Waczyński, Edyta Wróbel, Technologie mikroelektroniczne: metody wytwarzania materiałów i struktur półprzewodnikowych. Gliwice: Wydaw. Politechniki Śląskiej, 2006 r.
5. Ed. R. W. Cahn, P. Haasen, E. J. Kramer, Materials Science and Technology: a Comprehensive Treatment, Vol. 15/16 (Vol. 10), Processing of Metals and Alloys. Processing of Semiconductors. Weinheim: WILEY-VCH Verlag, 2005 r.

SUPPLEMENTARY REFERENCE MATERIALS

LITERATURA UZUPEŁNIAJĄCA

1. I.A. Wrona, M.W. Jarosik, Porównanie wybranych właściwości diod elektroluminescencyjnych. Wybrane zagadnienia inżynierii produkcji w zastosowaniach medycznych, Fundacja na Rzecz Promocji Nauki i Rozwoju TYGIEL, 147 (2015).
2. A.P. Durajski, M.W. Jarosik, K. Kosk-Joniec, I.A. Wrona, M. Kostrzewa, K.A. Szewczyk, R. Szczeńniak, Phonon-Induced Superconducting State: from Metallic Hydrogen to LaH₁₀, Act Physica Polonica A, 138 (2020) 715.

LEARNING OUTCOMES

- › **EU1** The student has knowledge of the materials used in the electronics industry and is able to describe their properties and applications.
- › **EU2** The student is able to correctly collect and process of measurement data and is able to correctly interpret the obtained results and present them in the form of a report.

TEACHING TOOLS

- › Multimedia presentations.
- › Manuals, scripts.
- › Sets of laboratory exercises which are the equipment of the Department of Physics.

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

- › **F1.** Assessment of self-preparation for laboratory.
- › **F2.** Assessment of the final report's preparation from respective laboratory exercises.

- › **P1.** Assessment of the knowledge acquired during the lectures - final test.
- › **P2.** Average grade for preparation to laboratory classes and final reports on individual exercises.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures	15	0,6
Seminar		
Classes		
Laboratory	15	0,6
Project		
Test		
Exam		
Total contact hours	30	1,2
Student's own work		
Getting acquainted with the indicated literature	4	0,16
Preparation for seminar		
Preparation for classes		
Preparation for lab	7	0,28
Project preparation		
Consultation	2	0,08
Preparation for the test	7	0,28
Total student's own work	20	0,8
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_W04, K_U09, K_K01,	C1	L1 - L15	P1
EU 2	K_W01, K_W03, K_U03, K_U09, K_K02,	C2	Lab1 - Lab15	F1, F2, P2

FORM OF ASSESSMENT - DETAILS

EU1 The student has knowledge of the materials used in the electronics industry and is able to describe their properties and applications.

- › 2,0 The student has no knowledge of the materials used in the electronics industry and is also unable to describe their properties and applications.
- › 3,0 The student has a cursory knowledge of the materials used in the electronics industry, can describe their properties in general, but cannot describe their application.
- › 3,5 The student has a cursory knowledge of the materials used in the electronics industry, can describe their properties in general and can describe their applications in general.
- › 4,0 The student has detailed knowledge of the materials used in the electronics industry and can describe their properties and applications in general.
- › 4,5 The student has detailed knowledge of the materials used in the electronics industry and can describe their properties in detail and describe their applications in general.
- › 5,0 The student has a detailed and systematic knowledge of the materials used in the electronics industry and is able to describe in detail their properties and applications.

EU2 The student is able to correctly collect and process measurement data and is able to correctly interpret the obtained results and present them in the form of a report.

- › 2,0 The student is not able to collect and process measurement data and is not able to interpret the obtained results and present them in the form of a report.

- › 3,0 The student is skilful at collecting and processing measurement data and, student can interpret the obtained results and present them in the form of a report with slight errors and without meeting the required deadlines.
- › 3,5 The student is able to collecting and processing measurement data and, student can interpret the obtained results and present them in the form of a report with slight errors and without meeting the required deadlines.
- › 4,0 The student is able to collecting and processing measurement data and, student can interpret the obtained results and present them in the form of a report with slight errors and with required deadlines.
- › 4,5 The student is able to collecting and processing measurement data and, student can interpret the obtained results and present them in the form of a report with required deadlines.
- › 5,0 The student is very good at collecting and processing measurement data and is able to interpret the obtained results flawlessly and present them in the form of a synthetic report with the required deadlines.

Polish course name	FIZYKA INŻYNIERSKA
English course name	ENGINEERING PHYSICS
Course code	WIP-MDL-D1-EP-02
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	2
Number of ECTS points	5
Ways of assessment	Exam

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
30		15	15	

TEACHERS:

Dr Katarzyna Pawlik,

Dr hab. Piotr Pawlik, prof PCz.

COURSE OBJECTIVES:

- › **C1** Providing students with knowledge of the basics of physics, including mechanics, vibrational and wave motion, statics and fluid dynamics, thermodynamics, optics, electricity, magnetism, atomic and nuclear physics necessary to understand the basic physical phenomena and processes occurring in nature and technology.
- › **C2** Students master the ability to apply theoretical knowledge in solving simple physics problems.
- › **C3** Students obtain the practical skills of measuring basic physical quantities and the use of simple measurement systems.
- › **C4** Students acquire practical skills in data collection, processing, development, interpretation, and presentation in the form of a report.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS, AND OTHER COMPETENCIES:

1. Basic knowledge of math and physics.

2. Ability to work independently and in a group.
3. Ability to use literature and internet resources.

COURSE CONTENT

LECTURE

- › **L1** Scalars and vectors.
- › **L2** Mechanics of point mass and rigid body.
- › **L3** Oscillatory motion and waves.
- › **L4** Fluid statics and dynamics.
- › **L5** Temperature, kinetic theory, and the gas laws. Thermodynamics.
- › **L6** Electric charge electric field, electric potential.
- › **L7** Electric current, resistance, and Ohm's Law. Electric circuits.
- › **L8** Magnetic field and AC Circuits.
- › **L9** Electromagnetic waves. Geometric optics.
- › **L10** Basics of modern physics.
- › **L11** Elements of nuclear physics.

CLASSES

During the exercises, tasks and problems regarding selected content presented in the lecture are solved and colloquia are carried out.

LABORATORY

Students perform 6 exercises per semester. Exercises are selected from groups M, C, O or E, example topics are listed below:

M. MECHANICS LAB

- M-1 Determination of the density of liquids and solids using a pycnometer.
- M-2 Dependence of the pendulum vibration period on the amplitude.
- M-3 Determination of the acceleration due to gravity using a reversible pendulum.
- M-4 Determination of the moment of inertia of solids using torsional vibrations.

C. THERMODYNAMICS LAB

- C-1 Study of the temperature dependence of the viscosity coefficient of a liquid.
- C-2 Measurement of liquid surface tensions by peeling off method.
- C-3 Determination of the c_p/c_v ratio for air by the Clement-Desormes method.
- C-4 Determination of the latent heat coefficient for melting ice.

C-5 Determination of the latent heat coefficient for evaporation of water by calorimetric method.

O. OPTICS LAB

O-3 Determination of focal lengths using the Bessel method.

O-5 Determination of the wavelength of a laser diode light and a diffraction grating constant.

O-6 Determination of the wavelengths of basic colors in the white light spectrum using a diffraction grating.

O-7 Measurement of the radius of curvature of a flat-convex lens by the Newtonian ring method.

O-8 Optical spectra testing.

E. ELECTRICITY LAB

E-1 Characteristics of resistors.

E-2 Determination of electrical resistance using the Wheatstone bridge method.

E-3 Testing the Kirchhoff's II Law for a Single Circuit.

E-5 Measurement of capacitance by discharge method.

E-12 Testing the characteristics of the p-n junction.

E-14 Determination of escape velocity of an electron.

BASIC REFERENCES

1. D. Halliday, R. Resnick, J. Walker: Podstawy fizyki, tom I-V, Wydawnictwo Naukowe PWN, Warszawa 2015 r.
2. Podręcznik dostępny online: <https://openstax.org/subjects/science>
3. Jan Lech: Opracowanie wyników pomiarów w laboratorium podstaw fizyki, Wydawnictwo Wydziału Inżynierii Procesowej, Materiałowej i Fizyki Stosowanej PCz, Częstochowa 2005 r.

LEARNING OUTCOMES

- › **EU1** The student knows the theories and laws of physics, to the extent described by the curriculum content at a level that allows understanding and describing physical phenomena.
- › **EU2** The student can practically apply the acquired theoretical knowledge to solve problems in physics.

- › **EU3** The student can perform simple measurements of basic physical quantities, collect, process, and develop measurement data, assess measurement uncertainties, interpret the obtained results and prepare a report on the course of measurements.

TEACHING TOOLS

- › Multimedia presentations.
- › Laboratory equipment and guides.
- › CUT e-learning platform (possible use).

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

- › **F1.** Assessment of self-preparation and activity during exercises.
- › **F2.** Ratings from colloquia.
 - P1.** The average of F1 and F2.
 - F3.** Assessments of laboratory exercise reports.
 - P2.** The average grade of reports – laboratory.
 - P3.** Grade from the exam.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures	30	1,2
Seminar		
Classes	15	0,6
Laboratory	15	0,6
Project		
Test		
Exam	3	0,12
Total contact hours	63	2,52
Student's work		
Getting acquainted with the indicated literature	10	0,4
Preparation for seminar		
Preparation for classes	10	0,4
Preparation for lab	18	0,72

Project preparation		
Consultation	4	0,16
Preparation for the exam	20	0,8
Total student work	62	2,48
Total number of hours/ ECTS points for the course	125	5,0

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,	C1	L1 - L11	P3
EU 2	K_W01, K_W03, K_U03	C2	L1 - L11 Classes	F1, F2, P1
EU 3	K_W01, K_W03, K_U03	C3, C4	L1 - L11 Laboratory	F3, P2

FORM OF ASSESSMENT - DETAILS

EU1 The student knows the theories and laws of physics, to the extent described by the curriculum content at a level that allows understanding and describing physical phenomena.

- › 2,0 The student has no knowledge defined by EU1.
- › 3,0 The student has partial and poor knowledge of the field defined by EU1.
- › 3,5 The student fully meets and exceeds the requirements for a grade of 3,0, but does not fully meet the requirements for 4,0.
- › 4,0 The student has a slight gap in the knowledge defined by EU1.

- › 4,5 The student fully meets and exceeds the requirements for a grade of 4,0. but does not fully meet the requirements for 5,0.
- › 5,0 The student has mastered the knowledge of the field defined by EU1.

EU2 The student can practically apply the acquired theoretical knowledge to solve problems in physics.

- › 2,0 The student cannot solve even the simplest problems.
- › 3,0 The student can solve simple problems with the help of a teacher.
- › 3,5 The student fully meets and exceeds the requirements for a grade of 3,0. but does not fully meet the requirements for 4,0.
- › 4,0 The student can solve simple problems.
- › 4,5 The student fully meets and exceeds the requirements for a grade of 4,0. but does not fully meet the requirements for 5,0.
- › 5,0 The student can solve tasks of varying difficulty, and shows activity and creativity in the search for solutions.

EU 3 The student can perform simple measurements of basic physical quantities, collect, process, and develop measurement data, assess measurement uncertainties, interpret the obtained results and prepare a report on the course of measurements.

- › 2,0 The student does not know how to take measurements or prepare a report.
- › 3,0 The student takes measurements and prepares the report only with the help of the teacher.
- › 3,5 The student fully meets and exceeds the requirements for a grade of 3,0, but does not fully meet the requirements for 4,0.
- › 4,0 The student takes measurements and can prepare a report, which, however, has some shortcomings.
- › 4,5 The student fully meets and exceeds the requirements for a grade of 4,0. but does not fully meet the requirements for 5,0.
- › 5,0 The student takes measurements and prepares a complete report.

Polish course name	LOGISTYKA PRODUKCJI
English course name	PRODUCTION LOGISTICS
Course code	WIP-MDL-D1-PL-02
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	2
Number of ECTS points	3
Ways of assessment	Test, project

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15		6		9

TEACHERS:

Dr Marta Daron.

COURSE OBJECTIVES:

- › **C1** Providing students with knowledge in the field of production logistics system.
- › **C2** Obtaining by the students the practical skills in the field of designing and optimizing production logistics system.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Basic knowledge in the field of logistics.
2. Ability to work independently and in a group.
3. Ability to use literature sources, internet resources and a computer.

COURSE CONTENT

LECTURE

- › **L1** General theory of logistics, production logistics subsystem and the logistics system in a production enterprise.
- › **L2** Subject, scope and features of production logistics.

- › **L3** Work in progress inventory.
- › **L4, L5** Design of the logistics network, integrated systems supporting production – OPT, MRP, MRP II.
- › **L6, L7** Integrated systems supporting production – ERP, CIM, JiT.
- › **L8, L9** Lean Manufacturing as a modern technique in logistics management.
- › **L10, L11** Planning of material requirements, principles of controlling the flow of materials and raw materials.
- › **L12, L13** Logistics production infrastructure - requirements, means of internal transport, designing of transport routes, storage.
- › **L14** Types and forms of production and their impact on the production logistics system.
- › **L15** Evaluating of knowledge.

CLASSES

- › **C1** Introductory classes, repetition of basic knowledge about logistics systems with particular emphasis on production logistics.
- › **C2** Discussion of production and inventory planning issues, exercises and tasks.
- › **C3, C4** Scheduling of working time and usage of internal transport equipment in production departments, exercises and tasks.
- › **C5** Economical production batch size, exercises and tasks.
- › **C6** Test.

PROJECT

- › **P1** Introductory classes, tips and discussion of the final project.
- › **P2, P3, P4** Designing workstations and material flow in production departments.
- › **P5, P6, P7** Designing of transport tasks in production departments.
- › **P8, P9** Evaluation of final projects.

BASIC REFERENCES

1. Bendkowski, J., Matusek, M., Logistyka produkcji: praktyczne aspekty. Cz. 1. Planowanie i sterowanie produkcją. Gliwice: Wydaw. Politechniki Śląskiej, 2013 r.
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4. Logistyka produkcji: teoria i praktyka/Red. Fertsch, M., Cyplik, P., Hadaś Ł., Poznań: Instytut Logistyki i Magazynowania, 2010 r.
5. Logistyka produkcji: procesy, systemy, organizacja/red. nauk. Szymonik A., Difin, Warszawa 2012 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. Harris, R., Harris CH., Wilson, E., Logistyka wewnętrzna fabryki wg zasad Lean Manufacturing: przewodnik po systemie zarządzania materiałami dla specjalistów z produkcji, zarządzania produkcją, zakupów, zaopatrzenia oraz technologii, Wydaw. Lean Enterprise Institute Polska, Wrocław, 2013 r.
2. Daroń M., Górka M., Analiza wykorzystania urządzeń transportowych w magazynie wyrobów gotowych, Logistyka 5/2011.
3. Daroń M., Górka M., Wybrane problemy zarządzania zapasami w przedsiębiorstwie produkcyjnym, Logistyka 5/2013.
4. Jonak J., Nieoczym A., Logistyka w obszarze produkcji i magazynowania Wydaw. Politechniki Lubelskiej, Lublin 2014 r.

LEARNING OUTCOMES

- › **EU1** Student knows the tasks of the production logistics system and the principles of planning and use of production resources in manufacturing enterprises.
- › **EU2** Student has the ability to design and optimize logistics tasks at production departments.

TEACHING TOOLS

- › Multimedia presentations.
- › CUT e-learning platform (possible use).
- › Computer stations with software.

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

- › **F1.** The evaluation of classes knowledge – a final test.
- › **F2.** The evaluation of project knowledge – a final project.

- › **F3.** The assessment during classes – activities and tasks during classes.
- › **P1.** The assessment of lectures knowledge – a final test.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures	15	0,6
Seminar		
Classes	6	0,24
Laboratory		
Project	9	0,36
Test		
Exam		
Total contact hours	30	1,2
Student's own work		
Getting acquainted with the indicated literature	10	0,4
Preparation for seminar		
Preparation for classes	6	0,24
Preparation for lab		
Project preparation	15	0,6
Consultation	4	0,16
Preparation for the test	10	0,4
Total student's own work	45	1,8
Total number of hours/ ECTS points for the course	75	3,0

ADDITIONAL INFORMATION

Timetable of classes	https://usosweb.pcz.pl
Information about the consultation (time + place)	https://wz.pcz.pl

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_U04, K_K02,	C1	L1 - L15	P1
EU 2	K_W05, K_U04, K_K02,	C2	C1 - C6, P1 - P9	F1, F2, F3

FORM OF ASSESSMENT - DETAILS

EU1 Student knows the tasks of the production logistics system and the principles of planning and use of production resources in manufacturing enterprises.

- › 2,0 The student does not know the basic tasks of production logistics system and the principles of planning and use of production resources in production enterprises.
- › 3,0 The student partially knows basic tasks of production logistics system and the principles of planning and use of production resources in production enterprises.
- › 3,5 The student knows basic tasks of the production logistics system and the principles of planning and use of production resources in production enterprises
- › 4,0 The student knows well tasks of production logistics system and the principles of planning and using production resources in production enterprises.
- › 4,5 The student knows almost very well tasks of the production logistics system and the principles of planning and using production resources in production enterprises.
- › 5,0 The student knows very well tasks of the production logistics system and the principles of planning and using production resources in production enterprises.

EU2 Student has the ability to design and optimize logistics tasks at production departments.

- › 2,0 The student is not able to design and optimize logistics tasks at production departments.
- › 3,0 The student is partially able to design and optimize logistics tasks at production departments.
- › 3,5 The student is almost able to design and optimize logistics tasks in production departments,
- › 4,0 The student is able to design and optimize logistics tasks at production departments at well level.
- › 4,5 The student is able to design and optimize logistics tasks in production departments at almost very well level.
- › 5,0 The student is able to design and optimize logistics tasks in production departments at very well level.

Polish course name	NOWOCZESNE MATERIAŁY I TECHNOLOGIE
English course name	MODERN MATERIALS AND TECHNOLOGIES
Course code	WIP-MDL-D1-MMAT-02
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	2
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. Józef Iwaszko, prof. PCz.

COURSE OBJECTIVES:

- › **C1** Providing students with knowledge about modern engineering materials, including their structures, properties and applications.
- › **C2** Acquainting students with selected modern technologies of manufacturing engineering materials.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Knowledge of the basics of the science of the structure of matter.
2. Knowledge of the rules of work safety when using machines and technological devices.
3. Ability to use various sources of information, including manuals and technical documentation.
4. Ability to work independently and in a group.
5. Ability to correctly interpret and present the results of laboratory test.

COURSE CONTENT

LECTURE

- › **L1** Basic criteria for the classification of composites.
- › **L2** Characteristics of modern composite reinforcing fibers.
- › **L3** Technologies for the production of modern composites.
- › **L4** Powder metallurgy technology.
- › **L5** Modern coating technologies.
- › **L6 - L8** Modern carbon materials, including fullerenes, nanotubes and graphene
- › **L9** Shape memory materials.
- › **L10** Metallic glass, technologies for the production of amorphous materials, properties and application of metallic glasses.
- › **L11 - L13** Nanomaterials, nanotechnologies - properties and selected manufacturing technologies.
- › **L14** Superconductor, the phenomenon of superconductivity, properties and application of superconductors.
- › **L15** Final test.

LABORATORY

- › **Lab1, Lab2** Fibrous materials: glass, carbon, Kevlar and vectran fibers: microstructural studies and selected properties.
- › **Lab3 - Lab5** Fiber-reinforced composite materials - contact method for the production of composites, microstructural tests and selected properties.
- › **Lab6, Lab7** Composite materials reinforced with particles - determination of volume and weight fractions of the reinforcing phase.
- › **Lab8, 9, 10** Materials produced by powder metallurgy methods - microstructural and mechanical tests of tool steels obtained by the traditional method and the powder metallurgy method.
- › **Lab11** Shape memory materials - determination of the temperature characteristic for two-way transformation in the nitinol alloy.
- › **Lab12** TBC (thermal barrier coatings) - microstructural studies.
- › **Lab13, Lab14** Metallic glasses - microstructural and x-ray structure tests.
- › **Lab15** Final test.

BASIC REFERENCES

1. A. Huczko, A. Dąbrowska, M. Kurcz, Grafen. Otrzymywanie, charakterystyka, zastosowania, Wydawnictwa Uniwersytetu Warszawskiego, 2016 r.

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3. L.A. Dobrzański: Zasady doboru materiałów inżynierskich z kartami charakterystyk, Wyd. Politechniki Śląskiej, Gliwice 2000 r.
4. Jerzy Nowacki, Spiekane metale i kompozyty z osnową metaliczną, Wydawnictwo-Naukowo-Techniczne 2005 r.
5. A. Huczko, M. Kurcz, M. Popławska, Nanorurki węglowe. Otrzymywanie, charakterystyka, zastosowanie, Wydawnictwa Uniwersytetu Warszawskiego, 2017 r.
6. Królikowski Waclaw, Polimerowe kompozyty konstrukcyjne, Wydawnictwo Naukowe PWN, 2020 r.
7. Krzysztof Ziewiec, Szkła metaliczne otrzymywane z jednorodnej fazy ciekłej oraz z zakresu niemieszalności cieczy, Wydawnictwo Naukowe Uniwersytetu Pedagogicznego w Krakowie, 2012 r.
8. L. Dobrzański, G. Matula, Podstawy metalurgii proszków i materiały spiekane, Wydawca: International OCSCO World Press, 2012 r.
9. A. Boczkowska, G. Krzesiński, Kompozyty i techniki ich wytwarzania, 2016 r., Wydawnictwo: Politechnika Warszawska.

SUPPLEMENTARY REFERENCE MATERIALS

1. Nowicki Jan: Materiały kompozytowe, Wyd. Pol. Łódzkiej, 1993 r.
2. Boczkowski A., Kapuściński J., Puciłowski K., Wojciechowski S.: Kompozyty, Wyd. Pol. Warszawskiej, Warszawa 2000 r.
3. Michael F. Ashby, Dawid R. H. Jones: Materiały inżynierskie, własności i zastosowanie, t.1, WNT, Warszawa, 1995 r.
4. J. Iwaszko, M. Sajed, Technological Aspects of Producing Surface Composites by Friction Stir Processing - A Review, Journal of Composites Science (J. Compos. Sci.) 2021, 5, 323; DOI:10.3390/jcs5120323.
5. J. Iwaszko, K. Kudła, K. Fila, "Technological aspects of friction stir processing of AlZn5.5MgCu aluminium alloy", Bulletin of The Polish Academy of Sciences, Technical Sciences , Vol. 66, (2018), 713-719. DOI: 10.24425/125338.
6. J. Iwaszko, K. Kudła, Effect of friction stir processing (FSP) on microstructure and hardness of AlMg10/SiC composite, Bulletin of The Polish Academy of

LEARNING OUTCOMES

- › **EU1** The student is able to characterize the essence and properties of modern engineering materials.
- › **EU2** The student is able to describe the application of modern engineering materials.
- › **EU3** The student is able to discuss the technologies of producing modern engineering materials.
- › **EU4** The student knows modern technologies for the production of engineering materials and can indicate their advantages over standard technologies.

TEACHING TOOLS

- › Lecture with the use of audiovisual aids.
- › Laboratory:
 - measuring instruments and research apparatus,
 - test stands for making test samples,
 - examples of finished products and semi-finished products manufactured by various techniques.

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

- › **F1.** 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 lectures - final test.

STUDENT WORKLOAD

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

Project		
Test		
Exam		
Total contact hours	30	1,2
Student's own work		
Getting acquainted with the indicated literature	15	0,6
Preparation for seminar		
Preparation for classes		
Preparation for lab	15	0,6
Project preparation		
Consultation	4	0,16
Preparation for the test	11	0,44
Total student's own work	45	1,8
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_W03, K_W04, K_K02,	C1	L1, L2, L6 - L9, L11 - L15, Lab1 - Lab15	F1, P1
EU 2	K_W03,	C1	L1 - L4,	F1, P1

	K_W04, K_K02,		L6 - L15 Lab1 - Lab15	
EU 3	K_W03, K_W04, K_U03, K_K02,	C2	L3 - L5, L10 - L15 Lab1 - Lab15	F1, P1
EU4	K_W03, K_W04, K_U03, K_K02,	C2	L3 - L5, L10 - L15 Lab1 - Lab15	F1, P1

FORM OF ASSESSMENT - DETAILS

EU1 The student is able to characterize the essence and properties of modern engineering materials.

- › 2,0 The student has not mastered the basic knowledge about the nature and properties of modern engineering materials.
- › 3,0 The student has acquired a basic knowledge of the essence and properties of modern engineering materials.
- › 3,5 The student has almost well mastered the knowledge of the essence and properties of modern engineering materials.
- › 4,0 The student has mastered the knowledge of the essence and properties of modern engineering materials.
- › 4,5 The student has almost very well mastered the knowledge about the essence and properties of modern engineering materials.
- › 5,0 The student has mastered the knowledge of the essence and properties of modern engineering materials very well, is able to comprehensively characterize the properties of these materials and make a comparison with the properties of other materials.

EU2 The student is able to describe the application of modern engineering materials.

- › 2,0 The student is not able to describe the application of modern engineering materials.
- › 3,0 The student mastered the basic knowledge about the use of modern engineering materials.

- › 3,5 The student has mastered the knowledge almost well and can correctly indicate the areas of application of modern engineering materials.
- › 4,0 The student has mastered the knowledge well and is able to indicate the areas of application of modern engineering materials.
- › 4,5 The student has mastered the knowledge almost very well and is able to indicate the areas of application and specific examples of the use of modern engineering materials to an almost very good degree.
- › 5,0 The student has mastered the knowledge very well and is able to indicate the areas of application and specific examples of the use of modern engineering materials to a very good degree.

EU3 The student is able to describe the technologies of producing modern engineering materials.

- › 2,0 The student does not have a basic knowledge of the technology of producing modern engineering materials.
- › 3,0 The student has a basic knowledge of the technology of manufacturing modern engineering materials.
- › 3,5 The student has almost well mastered the knowledge of the technology of producing modern engineering materials.
- › 4,0 The student has mastered the knowledge of the technology of manufacturing modern engineering materials.
- › 4,5 The student has almost very well mastered the knowledge of the technology of producing modern engineering materials.
- › 5,0 The student has mastered the knowledge of the technology of manufacturing modern engineering materials very well and is able to discuss in detail the specificity of the processes underlying these technologies.

EU4 The student knows modern technologies for the production of engineering materials and is able to indicate their advantages over standard technologies.

- › 2,0 The student does not know modern technologies for the production of engineering materials and is not able to indicate their advantages over standard technologies.
- › 3,0 The student has a basic knowledge of modern technologies for the production of engineering materials and is able to indicate their advantage over standard technologies in a general manner.

- › 3,5 The student has mastered the knowledge to an almost good degree about modern technologies for the production of engineering materials and to an almost good degree is able to indicate their advantage over standard technologies.
- › 4,0 The student has a good command of the knowledge of modern technologies for the production of engineering materials and is able to show their advantage over standard technologies.
- › 4,5 The student has almost very well mastered the knowledge of modern technologies for the production of engineering materials and is able to almost very well characterize their advantage over standard technologies.
- › 5,0 The student has mastered the knowledge of modern technologies for the production of engineering materials and is able to characterize in detail their advantage over standard technologies.

Polish course name	MATERIAŁY NOWEJ GENERACJI
English course name	NEW GENERATION MATERIALS
Course code	WIP-MDL-D1-NGM-02
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	2
Number of ECTS points	3
Ways of assessment	Test

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15			15	

TEACHERS:

Dr inż. Małgorzata Lubas.

COURSE OBJECTIVES:

- › **C1** To provide students with basic knowledge of engineering materials - new generation.
- › **C2** To acquaint students with manufacturing techniques, applications and research methods of new generation materials.
- › **C3** Student are able to use various sources of information and are able to prepare and present the results obtained during the class.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. The student knows the basics in physics, mathematics, chemistry.
2. Student skillfully: uses mathematical operations to solve the tasks set, uses various sources of information, instructions, technical documentation, correctly interprets and presents the results obtained in the course of laboratory exercises.
3. The student knows the principles of work safety in the use of machinery and technical equipment, works independently and in a group.

COURSE CONTENT

LECTURE

- › **L1, 2** Classification and nomenclature of engineering materials, bonds between atoms. General characteristics of basic groups of engineering materials.
- › **L 3, 4** Structure of materials: crystalline, amorphous. Phase equilibrium systems.
- › **L 5** Selection of engineering materials in modern engineering.
- › **L 6, 7** New generation metallic materials, shape memory alloys.
- › **L 8, 9, 10** Ceramic, vitreous and glass-crystalline materials (new generation glasses).
- › **L 11, 12** Modern polymeric and composite materials.
- › **L 13** Characterization of nanomaterials.
- › **L 14** New generation of biomaterials.
- › **L 15** Test methods for new generation materials, colloquium.

LABORATORY

- › **Lab 1** Health and safety training and discussion of the rules for passing the course.
- › **Lab 2, 3** Physical properties of selected new generation materials.
- › **Lab 4, 5** Modern ceramic materials - manufacture and determination of basic properties.
- › **Lab 6, 7** Fibre - reinforced composites and not only... - tipping, testing of selected properties of the obtained materials.
- › **Lab 8, 9** Fibrous materials of the new generation - studies of selected properties.
- › **Lab 10, 11** Glass and glass-ceramic materials as new generation materials - fabrication and determination of selected properties.
- › **Lab 12, 13** Metallic materials of the new generation - microstructural studies.
- › **Lab 14, 15** Surface modification - microstructural studies and selected properties. Course credit.

BASIC REFERENCES

1. S. Jusupow, Technologia Produkcji Wyrobów Ceramicznych, Wyd. Nasza wiedza, 2021 r., j. ang.
2. R. Pampuch, Współczesne materiały ceramiczne, Wyd. Nauk.-Dydakt. AGH 2005 r.
3. J. Mastalska-Popławska, P. Rutkowski, J. Huebner i inni, red. D. Kata, Skrypt do zajęć laboratoryjnych z przedmiotu Nanomateriały i nanotechnologie, Wyd. Oficyna Wydawnicza Politechniki Warszawskiej, 2022 r.
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8. Blicharski M., Inżynieria powierzchni. WNT, Warszawa 2009 r.
9. Kaczorowski M., Krzyńska A., Konstrukcyjne materiały metalowe, ceramiczne i kompozytowe. Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2008 r.
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SUPPLEMENTARY REFERENCE MATERIALS

1. K. Subotowicz, Ceramika dla każdego, Wydawnictwo: Katowice ELAMED, 2008 r.
2. A. Jastrzębska, M. Kostecki, A. Olszyna i inni, Tworzywa ceramiczne. Ćwiczenia laboratoryjne, Wyd. Oficyna PW., 2020 r.
3. Prociak A., Poliuretanowe materiały termoizolacyjne nowej generacji, Wyd. Pol. Krakowskiej, Kraków 2008 r.
4. Pampuch, K. Haberko, M. Kordek, Nauka o procesach ceramicznych, PWN Warszawa 1992 r.

LEARNING OUTCOMES

- › **EU1** Has theoretical knowledge of new generation engineering materials their properties, manufacturing, application, and testing methods.
- › **EU2** The Student can prepare a report on the implementation of exercise.

TEACHING TOOLS

- › Multimedia presentations.
- › Laboratory equipment and guides.

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

- › **F1.** Evaluation of mastery of the learning material covered by the laboratory - colloquium.
- › **F2.** Evaluation of reports.
- › **P1.** Evaluation of mastery of the teaching material covered in the lectures – colloquium.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures	15	0,6
Seminar		
Classes		
Laboratory	15	0,6
Project		
Test		
Exam		
Total contact hours	30	1,2
Student's own work		
Getting acquainted with the indicated literature	10	0,4
Preparation for seminar		
Preparation for classes		
Preparation for lab	15	0,6
Project preparation		

Consultation	4	0,16
Preparation for the test	16	0,64
Total student's own work	45	1,80
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_W01, K_W03, K_W04, K_U03, K_U04, K_U05, K_K01, K_K02, K_K04,	C1, C2, C3	L1 – L15 Lab1 - Lab15	F1, P1
EU 2	K_K01, K_K02, K_K04,	C3	Lab1 - Lab15	F2

FORM OF ASSESSMENT - DETAILS

EU1 The student has theoretical knowledge of the new generation of engineering materials their properties, manufacture, application, and research methods.

- › 2,0 The student has not mastered the basic knowledge of new generation engineering materials their properties, manufacture, application, and their research methods.

- › 3,0 The student has partially (sufficiently) mastered the knowledge of new generation engineering materials their properties, manufacturing, application and their research methods.
- › 3,5 The student has almost mastered the knowledge of new generation engineering materials their properties, manufacture, application and their research methods.
- › 4,0 The student has well mastered the knowledge of new generation engineering materials their properties, manufacture, application and their research methods.
- › 4,5 The student has almost very well mastered the knowledge of new generation engineering materials their properties, manufacturing, application, and their research method.
- › 5,0 The student has mastered very well the knowledge of new generation engineering materials their properties, manufacturing, application and their research methods.

EU2 The student is able to prepare a report on the implementation of the exercises

- › 2,0 The student is not able to prepare a report, is not able to present the results of his research.
- › 3,0 Student is partially able to prepare a report on the course of implementation of exercises.
- › 3,5 Student is almost able to prepare a report and present the results of their research.
- › 4,0 The student developed the report well and presented the results of the research obtained.
- › 4,5 The student almost very well developed the report and presented the obtained research results.
- › 5,0 The student developed the report very well and presented the obtained research results.

Polish course name	METODY BADANIA MATERIAŁÓW
English course name	METHODS OF MATERIALS INVESTIGATION
Course code	WIP-MDL-D1-MOMI-02
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	2
Number of ECTS points	5
Ways of assessment	Exam

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15			30	

TEACHERS:

Dr inż. Zbigniew Bałaga.

COURSE OBJECTIVES:

- › **C1** Providing students with basic knowledge in the field of research methods and techniques for mechanical and functional properties of engineering materials.
- › **C2** Mastering the use of selected modern research equipment by students.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Basic knowledge of physics, chemistry, work safety rules when using machines and devices
2. Ability to use basic measuring tools.
3. Ability to work alone and in a group.
4. Ability to prepare written reports on the performed laboratory exercises.
5. Ability to use literature sources and internet resources.

COURSE CONTENT

LECTURE

- › **L1, L2** Introduction: materials, their structure and materials testing methods.
- › **L3, L4** Structural investigation of materials.
- › **L5, L6** Quantitative description of the structure of materials.
- › **L7, L8, L9, L10, L11** Methods of testing the properties of materials.
- › **L12, L13, L14, L15** Non - destructive testing of materials.

LABORATORY

- › **Lab1** Acquainting students with the rules of passing the course.
- › **Lab2 - Lab9** Research on the structure of materials.
- › **Lab10 - Lab20** Research on the properties of materials.
- › **Lab21 - Lab29** Non-destructive testing of materials.
- › **Lab30** Test.

BASIC REFERENCES

1. G. Golański, A. Dudek, Z. Bałaga: Metody badania właściwości materiałów. Wyd. Politechnika Częstochowska 2011 r.
2. Z. L. Kowalewski: Współczesne badania wytrzymałościowe. Wyd. Biuro Gamma, Warszawa 2008 r.
3. M. Wojas: Wady wyrobów wykrywane metodami nieniszczącymi - Cz.2. wady eksploatacyjne. Wyd. Biuro Gamma, Warszawa 2006 r.
4. J. Lis: Laboratorium z nauki o materiałach, Wyd. AGH, Kraków 2003 r.
5. K. Przybyłowicz: Metody badania metali i stopów. Wyd. AGH, Kraków 1997 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. M. Łomozik: Metaloznawstwo i badania metalograficzne połączeń spawanych. Instytut Spawalnictwa, Gliwice 2005 r.
2. M. Blicharski: Odkształcanie i pękanie. Uczelniane Wyd. AGH, Kraków 2002 r.
3. L.A. Dobrzański: Podstawy nauki o materiałach i metaloznawstwo. Materiały inżynierskie z podstawami projektowania materiałowego. WNT, Warszawa 2002 r.

LEARNING OUTCOMES

- › **EU1** The student has basic theoretical knowledge in the field of studying the structure and functional properties of materials.
- › **EU2** The student has a basic knowledge of the operation, operation and selection of basic research equipment.
- › **EU3** The student is able to prepare a report on the course of the implementation of laboratory exercises.

TEACHING TOOLS

- › Multimedia presentations.
- › Laboratory equipment and guides.
- › The e-learning platform of the Czestochowa University of Technology (if the classes are held in a stationary form, it can be used as an auxiliary tool), or other tools for distance learning. Computer stations with software.

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

- › **F1.** Assessment of the implementation of tasks included in the curriculum.
- › **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 lectures – exam.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures	15	0,6
Seminar		
Classes		
Laboratory	30	1,2
Project		
Test		
Exam	2	0,08
Total contact hours	47	1,88

Student's own work		
Getting acquainted with the indicated literature	26	1,04
Preparation for seminar		
Preparation for classes		
Preparation for lab	26	1,04
Project preparation		
Consultation	4	0,16
Preparation for the exam	22	0,88
Total student's own work	78	3,12
Total number of hours/ ECTS points for the course	125	5,0

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_W03, K_W04, K_U08, K_K01,	C1, C2	L1 - L15 Lab1 - Lab30	F1, P1
EU 2	K_W01, K_W03, K_W04, K_U08,	C1, C2	L1 - L15 Lab1 - Lab30	F1, F2, P1

	K_K01,			
EU 3	K_W01, K_W03, K_W04, K_U08, K_U09, K_K01,	C1, C2	Lab1 - Lab30	F2, P1

FORM OF ASSESSMENT - DETAILS

EU1 The student has basic theoretical knowledge in the field of studying the structure and functional properties of materials.

- › 2,0 The student has not mastered the basic theoretical knowledge in the field of studying the structure and functional properties of materials.
- › 3,0 The student partially mastered the basic theoretical knowledge in the field of studying the structure and functional properties of materials.
- › 3,5 The student has almost mastered the basic theoretical knowledge in the field of studying the structure and functional properties of materials.
- › 4,0 The student has mastered good the basic theoretical knowledge in the field of studying the structure and functional properties of materials.
- › 4,5 The student has mastered the basic theoretical knowledge in the field of studying the structure and functional properties of materials almost very good.
- › 5,0 The student has mastered the basic theoretical knowledge in the field of studying the structure and functional properties of materials very good.

EU2 The student has a basic knowledge of the operation, operation and selection of basic research equipment.

- › 2,0 The student has not mastered the basic knowledge about the operation, operation and selection of basic research equipment.
- › 3,0 The student partially mastered the basic knowledge about the operation, operation and selection of basic research equipment.
- › 3,5 The student has almost mastered the basic knowledge of the operation, operation and selection of basic research equipment.
- › 4,0 The student has mastered good the basic knowledge of the operation, operation and selection of basic research equipment.

- › 4,5 The student has mastered the basic knowledge of the operation, maintenance and selection of basic research equipment almost very good.
- › 5,0 The student has mastered the basic knowledge of the operation, operation and selection of basic research equipment very good.

EU3 The student is able to prepare a report on the course of the implementation of laboratory exercises.

- › 2,0 The student is not able to prepare a report on the course of the implementation of laboratory exercises.
- › 3,0 The student can partially prepare a report on the course of the implementation of laboratory exercises.
- › 3,5 The student can almost prepare a report on the course of the implementation of laboratory exercises.
- › 4,0 The student is able to prepare a report on the implementation of laboratory exercises good.
- › 4,5 The student is almost very good at preparing a report on the implementation of laboratory exercises.
- › 5,0 The student is very good at preparing a report on the course of the implementation of laboratory exercises.

Polish course name	INSTRUMENTARIUM BADAWCZE
English course name	INSTRUMENTATION OF RESEARCH
Course code	WIP-MDL-D1-IOR-02
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	2
Number of ECTS points	5
Ways of assessment	Exam

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15			30	

TEACHERS:

Dr inż. Zbigniew Bałaga.

COURSE OBJECTIVES:

- › **C1** Provide students with basic knowledge about measuring equipment.
- › **C2** To acquaint students with the methods of materials research.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Basic knowledge of physics, chemistry, work safety rules when using machines and devices.
2. Ability to use basic measuring tools.
3. Ability to work alone and in a group.
4. Ability to prepare written reports on the performed laboratory exercises.
5. Ability to use literature sources and internet resources.

COURSE CONTENT

LECTURE

- › **L1** Outline in the development of materials and trends in the development of methods of their study.
- › **L2 - L5** Apparatus used for macroscopic and microscopic examination of materials (construction and types of microscopes).
- › **L6 - L11** Research instruments for determining the mechanical properties of materials (construction and use of a universal testing machine, construction and types of hardness testing devices).
- › **L12 - L15** Apparatus used in non-destructive testing of materials.

LABORATORY

- › **Lab1** Acquainting students with the rules of passing the course.
- › **Lab2 - L3** Macroscopic research.
- › **Lab4 - L11** The use of microscopes in the assessment of the structure of materials.
- › **Lab12 - L20** The use of a universal testing machine and hardness testers in the assessment of material properties.
- › **Lab21 - L27** Construction and use of an X-ray diffractometer as an example of non-destructive testing.
- › **Lab28 - L29** Chemical composition analyzers.
- › **Lab30** Test.

BASIC REFERENCES

1. G. Golański, A. Dudek, Z. Bałaga: Metody badania właściwości materiałów. Wyd. Politechnika Częstochowska 2011 r.
2. Z. L. Kowalewski: Współczesne badania wytrzymałościowe. Wyd. Biuro Gamma, Warszawa 2008 r.
3. M. Wojas: Wady wyrobów wykrywane metodami nieniszczącymi - Cz.2. wady eksploatacyjne. Wyd. Biuro Gamma, Warszawa 2006 r.
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SUPPLEMENTARY REFERENCE MATERIALS

1. M. Łomozik: Metaloznawstwo i badania metalograficzne połączeń spawanych. Instytut Spawalnictwa, Gliwice 2005 r.
2. M. Blicharski: Odształcanie i pękanie. Uczelniane Wyd. AGH, Kraków 2002 r.

3. L.A. Dobrzański: Podstawy nauki o materiałach i metaloznawstwo. Materiały inżynierskie z podstawami projektowania materiałowego. WNT, Warszawa 2002 r.

LEARNING OUTCOMES

- › **EU1** The student has theoretical knowledge in the field of measuring equipment used in materials research.
- › **EU2** The student is able to calculate and interpret the obtained results of materials research.

TEACHING TOOLS

- › Multimedia presentations.
- › Laboratory equipment and guides.
- › The e-learning platform of the Częstochowa University of Technology (if the classes are held in a stationary form, it can be used as an auxiliary tool), or other tools for distance learning. Computer stations with software.

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

- › **F1.** Assessment of the implementation of tasks included in the curriculum.
- › **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 lectures – exam.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures	15	0,6
Seminar		
Classes		
Laboratory	30	1,2
Project		
Test		
Exam	2	0,08

Total contact hours	47	1,88
Student's own work		
Getting acquainted with the indicated literature	26	1,04
Preparation for seminar		
Preparation for classes		
Preparation for lab	26	1,04
Project preparation		
Consultation	4	0,16
Preparation for the exam	22	0,88
Total student's own work	78	3,12
Total number of hours/ ECTS points for the course	125	5,0

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_W03, K_W04, K_U08, K_K01,	C1, C2	L1 - L15 Lab1 - Lab30	F1, P1
EU 2	K_W01, K_W03, K_W04,	C1, C2	L1 - L15 Lab1 - Lab30	F1, F2, P1

	K_U08,			
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FORM OF ASSESSMENT - DETAILS

EU1 The student has theoretical knowledge in the field of measuring equipment used in materials research.

- › 2,0 The student has not mastered the basic theoretical knowledge in the field of measuring equipment used in materials research.
- › 3,0 The student partially mastered the basic theoretical knowledge in the field of measuring equipment used in materials research.
- › 3,5 The student has almost mastered the basic theoretical knowledge in the field of measuring apparatus used in materials research.
- › 4,0 The student has mastered the basic theoretical knowledge in the field of measuring apparatus used in materials research.
- › 4,5 The student has almost very well mastered the basic theoretical knowledge in the field of measuring equipment used in materials research.
- › 5,0 The student has mastered the basic theoretical knowledge in the field of measuring equipment used in materials research very well.

EU2 The student is able to calculate and interpret the obtained results of materials research

- › 2,0 The student has not mastered the conversion and interpretation of the obtained material test results.
- › 3,0 The student partially mastered the conversion and interpretation of the obtained material test results.
- › 3,5 The student has almost mastered the conversion and interpretation of the obtained material test results.
- › 4,0 The student has mastered the conversion and interpretation of the obtained material test results.
- › 4,5 The student mastered the conversion and interpretation of the obtained material test results almost very well.
- › 5,0 The student has mastered the conversion and interpretation of the obtained material test results very well.

Polish course name	WYCHOWANIE FIZYCZNE II
English course name	PHYSICAL EDUCATION II
Course code	WIP-MDL-D1-PE-03
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	3
Number of ECTS points	0
Ways of assessment	Credit

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
		30		

TEACHERS:

Mgr Maciej Żyła,

Mgr Dariusz Parkitny,

Mgr Agnieszka Krzyszkowska-Zalejska,

Dr Waldemar Różycki,

Mgr Piotr Pawłowski.

COURSE OBJECTIVES:

C1 Shaping and improving comprehensive physical development through the appropriate selection of training measures appearing in the structure of the selected sports discipline. Shaping pro-health attitudes among students of the Częstochowa University of Technology.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

There are no contraindications to participate in physical education classes.

COURSE CONTENT (Dean's groups are assigned to a specific discipline by the WFiS Study Management).

CLASSES (team games)

Volleyball

- › **C1** Organizational classes.
- › **C2** Diagnostics of technical skills - selected tests.
- › **C3** Improving the ways of moving around the volleyball court in a deficit of time with an additional task. The game proper.
- › **C4** Improving the bouncing of the ball in a high posture after moving along the net. The game proper.
- › **C5** Improving bouncing with both hands upwards at different distances, emphasizing a clean bounce, the ball without rotation. The game proper.
- › **C6** Improving the rotational play, in zone 1/5 on 8.9 meters of the field. The game proper.
- › **C7** Improving the adoption of the spinning serve to the zero point, tangent zones 2/3. The game proper.
- › **C8** Learning/improving the soaring service - fleets. The target serves between the top band and the edges of the antenna, the ball passes in a space of 80 cm. The game proper.
- › **C9** Improving ball bounces in a low stance with an unbalanced balance, volleyball pad, volleyball throw. The game proper.
- › **C10** Learning/improving ball bounces in the form of an exhibition, to wings 2/4 and to zone 3 "short". The game proper.
- › **C11** Improving dynamic capture, directional attack. Aim the corners of the field, or 8,9 meters of the opponent's court. The game proper.
- › **C12** Improving the pledge. Double block, aimed at creating a "block seam" - elimination of the so-called "Holes in the block." From the place, from the access from the step-away step, from your zone. The game proper.
- › **C13, C14** Proper game with the use of all the elements learned during the classes.
- › **C15** Final classes.

Basketball

- › **C1** Organizational classes.
- › **C2** Tests: slalom dribble, personal throws.
- › **C3, C4** Improving dribbling during small school games with additional tasks.
- › **C5 - C7** Teaching/improving plays, pick and roll. A 3x3 game with curtains.

- › **C8 - C10** Teaching/improving the correct defensive posture in zone defense 2: 3. Simplified game.
- › **C11 - C14** Teaching/improving positional attack in zone defense 2: 3. The game proper.
- › **C15** Credits.

Football

- › **C1** Organizational classes.
- › **C2** Diagnostics of technical skills.
- › **C3, C4** Improving ball handling with a change of direction and pace. The game proper.
- › **C5, C6** Improving hitting the ball with the leg and head after leading, after being fed from the air. The game proper.
- › **C7, C8** Improving ball receptions with the opponent's assist. The game proper.
- › **C9 - C11** Improving shots on goal in match situations. The game proper.
- › **C12 - C14** Indoor football tournament - 5-person teams.
- › **C15** Credits.

Classes (individual sports)

Functional training

- › **C1** Organizational classes.
- › **C2** Prehab, exercise overview, training circuit.
- › **C3, C4** Strengthening weak links - circuit training based on advanced functional exercises.
- › **C5 - C7** Strengthening the core - iliopsoas-lumbar complex, dynamic exercises.
- › **C8 - C10** Shaping cardiovascular and respiratory endurance, advanced stretching exercises combined with the control of the respiratory rhythm.
- › **C11 - C14** Comprehensive functional training: preparation for movement, core strengthening, flexibility - power, regeneration - comprehensive stretching combined with an individual breathing rhythm.
- › **C15** Final classes.

Health training

- › **C1** Organizational classes.

- › **C2** Theoretical and practical classes: introduction to TZ, preparation for movement, TA Schultz's concept - heaviness, warmth.
- › **C3 - C5** Shaping the proper mobility in the joints (mobility), introducing rollers to relax the muscles before stretching. TA - introduction of the full range of training- learning to listen to your own body.
- › **C6 - C9** Shaping mobility, introducing stabilization exercises (board), in various starting positions. Developing exercises on rollers - introducing rubbing to increase the effect of relaxation. Comprehensive stretching - aimed at stretching (within the individual limits of the muscles). TA - full range of training.
- › **C10 - C14** Preparation for movement, strengthening of postural muscles, comprehensive rolling, fascial stretching. TA - full range of training.
- › **C15** Final classes.

Fitness/pilates

- › **C1** Organizational classes.
- › **C2** Basic exercises to strengthen the "hoop of strength", that is the abdominal muscles, buttocks and the broadest muscles of the back. Introduction to exercises in the Pilates technique.
- › **C3** Exercises for the lats and torso muscles - the technique of performing these exercises and learning how to breathe properly. Stretching and relaxing exercises.
- › **C4** Arms and Upper Body - Strengthening and stretching and the ability to relax your upper body.
- › **C5** Pilates exercises - entering the first level - exercises to strengthen the back and abdominal muscles.
- › **C6** Strengthening the "central rim" through precise selection of exercises continuation of the first level.
- › **C7** Strengthening and stretching the legs - from buttocks to feet. Control over the care of maintaining the proper body system - level one.
- › **C8** Strengthening arm exercises. Relaxation of all the muscles of the "middle girdle" - level one.
- › **C9** Introducing Pilates exercises to the second level by extending the exercises from the first level.

- › **C10** Relaxing your upper body and stretching at the same time with a fit ball. Running the sacral area - second level.
- › **C11** Strengthening the "middle rim" and legs with weights - second level.
- › **C12** Strengthening arms and back with utensils - sticks, weights.
- › **C13** Level Three Pilates - continuing to strengthen the muscles, especially the "middle girdle". Coordination of movements in more complex exercises.
- › **C14** Applying advanced exercises to the abdominal and leg muscles coming from level three.
- › **C15** Final classes.

Table Tennis

- › **C1** Organizational classes.
- › **C2** Diagnostics of the technical skills of the game.
- › **C3** Starting position and basic rules of moving around the table. Singles game.
- › **C4, C5** Diagonal stroke versus forehand, point singles.
- › **C6 - C8** Strokes versus forehand and backhand diagonally, plays for points with alternating exercisers at the tables.
- › **C9 - C11** Improving known strokes, straight strokes, emphasis on the work of the legs at the table. Game for points with a change of practitioners.
- › **C12 - C14** Individual tournament - everyone's game.
- › **C15** Credits.

Swimming (activities only if the facility is rented)

- › **C1** Organizational classes. Occupational health and safety training, familiarization with the swimming pool regulations, study regulations, organization during classes - course of classes.
- › **C2** Dissolve.
- › **C3 - C5** Improving backstroke, long distance swimming.
- › **C6 - C8** Perfect your chest crawl style, long distance swimming.
- › **C9 - C11** Perfecting the classic style, swimming long distances.
- › **C12 - C14** Improving swimming techniques in the following styles: back, chest crawl, classic.
- › **C15** Final classes.

Gym (classes only if the facility is rented)

- › **C1** Organizational classes.

- › **C2** Acquainting students with the facility, the introductory part is carried out in the fitness room. Overview of the functioning of the gym equipment.
- › **C3 - C7** Anatomical muscle adaptation. Preparation for exercise - fitness room: raising the body temperature, dynamic stretching, mobilization exercises preparing for strength training. Moving to the gym: strength training - the FBW principle (full body workout), oxygen training - based on cross trainers, treadmills, bikes, steppers - continuous efforts with an intensity of about 60% HRmax
- › **C8 - C11** Muscular endurance. Preparation for movement - fitness room: steps, dynamic stretching, strengthening exercises with the use of dumbbells and fit ball, exercises for central stabilization. Moving to the gym: strength training - muscle endurance of large muscle groups, the number of repetitions from 12 to 16 in a series, oxygen training - based on cross trainers, treadmills, bikes, steppers - mixed efforts similar to interval exercises, heart rate depending on individual exercise capacity.
- › **C12 - C14** Training based on the training programs of the tutor or attempts to introduce individual training programs that must be approved by the tutor. Preparation for movement - fitness room: steps, dynamic stretching, strengthening exercises using the weight of your body, exercises for central stabilization. Transition to the gym - strength training, oxygen training - attempts to introduce hybrid training 5 min cross trainers / training circuit for large muscle groups 4 exercises.
- › **C15** Final classes

Tennis/Beach Tennis

- › **C1** Organizational classes.
- › **C2** Perfect forehand, backhand, singles school game.
- › **C3** Singles tournament - tennis.
- › **C4** Improving the ways of moving around the pitch during the game proper in beach tennis.
- › **C5** Singles tournament - beach tennis.
- › **C6** Credits.

BASIC REFERENCES

1. A. Zajęc, Współczesny trening siły mięśniowej. Katowice 2010 r.
2. Cz. Sieniak, Zasób ćwiczeń technicznych z zakresu koszykówki, piłki ręcznej, siatkówki i piłki nożnej dla celów dydaktycznych. Starachowice 2012 r.
3. G. Grządziel, W. Ljach, Piłka siatkowa: podstawy treningu, zasób ćwiczeń. Warszawa 2000 r.
4. J. P. Clemenceau, F. Delavier, M. Gundill, Stretching. Warszawa 2012 r.
5. M. Gundill, F. Delavier, Modelowanie sylwetki metodą Delaviera. Warszawa 2011 r.
6. P. Szeligowski, Trening siły eksplozywnej w sportach walki. Łódź 2012 r.
7. R. Biernat, strategia zapobiegania urazom w siatkówce. Olsztyn 2010 r.
8. R. Kulgawczuk, Nauczanie i uczenie się gry w siatkówkę. Szczecin 2012 r.
9. Z. Zatyrcz, L. Piasecki: Piłka siatkowa, Szczecin 2000 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. D. Farhi, The Breathing Book, New York USA - 2003 r.
2. J. Bookspan, The AB Revolution Fourth Edition, Milton Keynes UK - 2015 r.

LEARNING OUTCOMES

- › **EU1** The student knows the theoretical foundations of the selected sports discipline.
- › **EU2** The student is able to perform the technical elements of the selected discipline presented in class.
- › **EU3** The student is able to cooperate in: a couple, a group, a team, observes the rules of fair-play.

TEACHING TOOLS

- › Balls, mattresses, gymnastic benches, cones, teraband rubber, rollers.
- › E-learning platform of the Częstochowa University of Technology, or other distance learning tools multimedia presentations.

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

- › **F1.** Assessment of commitment during the course.
- › **F2.** Technical assessment of the correctness of the exercises performed.

- › **P1.** Credit based on attendance.
- › **P2.** Credit based on activity in the classroom.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures		
Seminar		
Classes	30	0
Laboratory		
Project		
Test		
Exam		
Total contact hours		
Student's own work		
Getting acquainted with the indicated literature		
Preparation for seminar		
Preparation for classes		
Preparation for lab		
Project preparation		
Consultation		
Preparation for the exam		
Total student's own work		
Total number of hours/ ECTS points for the course	30	0

ADDITIONAL INFORMATION

Timetable of classes	https://swfis.pcz.pl/menu/student---niezbedne-informacje
Information about the consultation (time + place)	https://swfis.pcz.pl/menu/student---niezbedne-informacje

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_K01,	C1	C1 - C15	F1, F2, P1, P2
EU 2	K_U02, K_K01,	C1	C1 - C15	F1, F2, P1, P2
EU 3	K_U02, K_K01,	C1	C1 - C15	F1, F2, P1, P2

FORM OF ASSESSMENT - DETAILS

EU1 The student knows the theoretical foundations of the selected sports discipline.

- › 2,0 The student does not know the basic rules of the selected sports discipline. He does not systematically participate in classes.
- › 3,0 The student partially knows the basic rules of the selected sports discipline. Participates systematically in classes.
- › 3,5 The student knows the basic rules of the chosen sport discipline. Participates systematically in classes.
- › 4,0 The student knows the basic rules of the selected sport discipline well. Participates systematically in classes.
- › 4,5 Student almost very well knows the basic rules of the chosen sports discipline. Participates systematically in classes.
- › 5,0 The student knows the basic rules of the chosen sport very well. Participates systematically in classes.

EU2 The student is able to perform the technical elements of the selected discipline presented in class.

- › 2,0 The student is not able to perform the technical elements of the selected discipline presented in the class. He does not systematically participate in classes.
- › 3,0 The student is able to partially perform the technical elements of the selected discipline presented in class. Participates systematically in classes.

- › 3,5 The student is almost able to perform the technical elements of the selected discipline presented in class. Participates systematically in classes.
- › 4,0 The student is able to perform well presented in class, technical elements in the field of the selected discipline. Participates systematically in classes.
- › 4,5 The student can almost very well perform the technical elements presented in the class in the field of the selected discipline. Participates systematically in classes.
- › 5,0 The student is able to very well perform the technical elements presented in the class in the field of the selected discipline. Participates systematically in classes.

EU 3 The student is able to cooperate in: a couple, a group, a team, observes the rules of fair-play.

- › 2,0 The student is not able to cooperate in: a couple, a group, a team, observes the rules of fair-play. He does not systematically participate in classes.
- › 3,0 The student is able to partially cooperate in: a couple, a group, a team, he observes the rules of fair-play. Participates systematically in classes.
- › 3,5 The student can almost cooperate in: a couple, a group, a team, he observes the rules of fair play. Participates systematically in classes.
- › 4,0 The student is able to cooperate well in: a couple, a group, a team, observes the rules of fair-play. Participates systematically in classes.
- › 4,5 The student is able to cooperate very well in: a couple, a group, a team, he observes the rules of fair play. Participates systematically in classes.
- › 5,0 The student is able to cooperate very well in: a couple, a group, a team, observes the rules of fair-play. Participates systematically in classes.

Polish course name	EKOLOGISTYKA
English course name	ECOLOGISTICS
Course code	WIP-MDL-D1-EL-03
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	3
Number of ECTS points	3
Ways of assessment	Test

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15		15		

TEACHERS:

Dr Joanna Krzywda.

COURSE OBJECTIVES:

- › **C1** Presentation and discussion of the concept of ecologistics, its processes, objects and subjects of interest, possibilities and effects of its application.
- › **C2** Characteristics of the waste management system including logistical aspects.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. The student knows the basics of logistics concepts.
2. the student knows the basics of MS Excel and is able to use its functions in order to work with data.
3. the student is able to analyse numerical data, present it in a graphic form and interpret it correctly.

COURSE CONTENT

LECTURE

- › **L1** Introduction to the subject. Presentation of the course outline, credit forms, class participation. Placing the ecologistics concept in the theory and practice of applied logistics.
- › **L2** Evolution, definitions and subject of the ecologistics concept, Comparison of ecologistics with related concepts and its relation to traditional logistics.
- › **L3** Circulation of waste and secondary raw materials in the environmentalist cycle - loops and supply chains.
- › **L4** Fundamentals of waste management in the concept of ecologistics.
- › **L5** Implementation of ecologicistic measures into business practice.
- › **L6, L7** Tasks and processes of ecologistics in waste management and their economic consequences.
- › **L8, L9** Legal and organisational determinants of waste management in Poland and EU countries.
- › **L10, L11** Analysis of the volume of generated industrial waste and the level of its management in Poland.
- › **L12, L13** Model concept of ecologistics processes implementation in waste streams management.
- › **L14** Cost model of ecologistics processes in waste streams management.
- › **L15** Advantages analysis of ecologistics in waste streams management.

CLASSES

- › **C1** Presentation of the assumptions of a descriptive model of the logistic process flow and a mathematical model of the logistic costs of industrial waste management in an industrial waste management company X.
- › **C2, C3, C4** Creation of an Excel database, according to a descriptive model, which takes into account the types of industrial waste according to the Waste Catalogue, characterises the customers of company X, determines the unit component costs associated with the transport and storage of waste and the management of waste by landfilling or giving to recovery organisations.
- › **C5, C6** Calculation from a database of the logistic costs, according to a mathematical model, associated with waste transport, storage, and management by landfilling or recovering.

- › **C7, C8** Analysing the results obtained by means of graphical and tabular presentation of the various types of statements, comparisons, calculations, etc., concerning the current status.
- › **C9, C10** Creation of forecasts related to individual cost components, analysis of different variants of data changes, presentation of forecasts in graphical and tabular form.
- › **C11, C12** Creation of forecasts related to individual cost components, analysis of different variants of data changes, presentation of forecasts in graphical and tabular form.
- › **C13, C14, C15** Creation of simulations related to individual cost components, analysis of different variants of changes in elements of both models, presentation of simulations in graphical and tabular form.

BASIC REFERENCES

1. Horodyńska M., Ekologistyka i zagospodarowanie odpadów, Wyd. Politechniki Śląskiej, Katowice, 2017 r.
2. Szymonik A., Ekologistyka. Teoria i praktyka, Difin, Warszawa, 2014 r.
3. Szoltysek J., Logistyka zwrotna. Reverse logistics, Instytut Logistyki i Magazynowania, Poznań, 2009 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. Korzeń Z., Ekologistyka, Biblioteka Logistyka, Poznań, 2001 r.
2. Rosik-Dulewska Cz., Podstawy gospodarki odpadami, Wydawnictwo Naukowe PWN, Warszawa, 2003 r.
3. Krzywda J., Krzywda D.: Concept of Sustainable Development in Metallurgical Waste Transport, referat, publikacja obcojęzyczna, Praga, International Institute of Social and Economic Sciences (IISES), 15th International Academic Conference, Rzym, Włochy (14 do 17 kwietnia 2015 r.).
4. Krzywda J. Negotiations in the Closed-Loop Aluminium Supply Chain, w: Polish Journal of Management Studies, Vol. 19, nr 2, 2020 r.

LEARNING OUTCOMES

EU 1 The student knows the concept of ecologistics, its legal and organisational conditions and is able to indicate differences and similarities between ecologistics and logistics and related concepts.

EU 2 The student is familiar with logistics costs and is able to discuss logistical processes in waste management companies.

TEACHING TOOLS

- › Lecture using audiovisual means.
- › Textbooks and scripts.
- › MS Excel software.

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

- › **F1.** Evaluation of the completion of the task.
- › **F2.** Assessment of mastery of the learning material subject to laboratory tasks - credit colloquium.

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	2	0,08
Exam		
Total contact hours	32	1,28
Student's own work		
Getting acquainted with the indicated literature	12	0,48
Preparation for seminar		
Preparation for classes	12	0,48
Preparation for lab		

Project preparation	6	0,24
Consultation	3	0,12
Preparation for the test	10	0,4
Total student's own work	43	1,72
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_W01, K_W02, K_W04, K_W06, K_W07, K_U04, K_U06, K_U07, K_K01, K_K02	C1, C2	L1 - L15	F1, F2
EU 2	K_W01, K_W02, K_W04, K_W06, K_W07, K_U04, K_U06, K_U07, K_K01, K_K02	C1, C2	C1 - C15	F1, F2

FORM OF ASSESSMENT - DETAILS

EU1 The student knows the concept of ecologistics, its legal and organisational conditions and is able to indicate differences and similarities between ecologistics and logistics and related concepts.

- › 2,0 The student does not know the basic rules of the ecologistics concept, its legal and organisational prerequisites and is not able to indicate the differences and similarities between ecologistics and logistics and related concepts.
- › 3,0 The student is partially familiar with the basic rules of the ecologistics concept, its legal and organisational conditions and is partially able to point out the differences and similarities between ecologistics and logistics and related concepts.
- › 3,5 The student almost knows the basic rules of the ecologistics concept, its legal and organisational conditions and can almost identify the differences and similarities between ecologistics and logistics and related concepts.
- › 4,0 The student well knows the basic rules of the ecologistics concept, its legal and organisational conditions and is able to indicate the differences and similarities between ecologistics and logistics and related concepts.
- › 4,5 The student is almost familiar with the basic rules of the ecologistics concept, its legal and organisational conditions and is able to indicate the differences and similarities between ecologistics and logistics and related concepts almost very well.
- › 5,0 The student knows the basic rules of the ecologistics concept, its legal and organisational conditions very well and is able to indicate the differences and similarities between ecologistics and logistics and related concepts.

EU2 The student is familiar with logistics costs and is able to discuss logistical processes in waste management companies.

- › 2,0 The student cannot identify logistic costs and cannot discuss the course of logistic processes in waste management enterprises.
- › 3,0 The student is partly able to identify logistic costs and partly able to discuss the course of logistic processes in waste management enterprises.
- › 3,5 The student is almost able to identify logistic costs and is almost able to discuss the course of logistic processes in waste management enterprises.

- › 4,0 The student is able to identify well logistic costs well and is able to discuss well the course of logistic processes in waste management enterprises.
- › 4,5 The student is able to identify logistic costs almost very well and is able to discuss almost very well the course of logistic processes in waste management enterprises almost well.
- › 5,0 The student is able to identify logistic costs very well and is able to discuss very well the course of logistic processes in waste management enterprises very well.

Polish course name	MATERIAŁY METALICZNE
English course name	METALLIC MATERIALS
Course code	WIP-PLM-D1-MM-03
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	3
Number of ECTS points	6
Ways of assessment	Exam

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
30			30	

TEACHERS:

Dr hab. inż. Józef Iwaszko, prof. PCz.

COURSE OBJECTIVES:

- › **C1** Provide students with basic knowledge about metallic materials, their classification and properties.
- › **C2** Acquainting students with the methodology of shaping the properties of metals, learning the crystal structure of the basic phases occurring in metals and methods of obtaining the required microstructures and properties, selection of chemical composition and manufacturing technology.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Knowledge of physics, mathematics and general chemistry.
2. Knowledge of the rules of work safety when using machines and technological devices.
3. Ability to select measurement methods.
4. Ability to perform mathematical operations to solve given tasks.
5. Ability to work independently and in a group.
6. Skills of correct interpretation and presentation of one's own actions.

COURSE CONTENT

LECTURE

- › **L1 - L3** What is metal? The main properties of metals. Characteristics of the metallic bond. Network structure of metals.
- › **L4, L5** Theory of the metallic state.
- › **L6, L7** The actual structure of metals. Characteristics of network defects. Polycrystalline structure of metals.
- › **L8 - L10** Metal alloys - characteristics and classifications. Solid solutions and intermetallic phases - definitions and classifications.
- › **L11, L12** Crystallization of metals - the mechanism of crystallization. Ingot crystallization. Solidification of feet in conditions of imbalance. Allotropic changes.
- › **L13, L14** Plastic deformation and recrystallization of metals.
- › **L15 - L17** Diagrams of phase equilibria of alloys - preparation method, main rules, cooling curves. Characteristics of phase equilibrium diagrams.
- › **L18 - L20** Characteristics of the Fe-Fe₃C diagram, characteristics of transformations and structural components, division of alloys according to the Fe-Fe₃C diagram and their characteristics.
- › **L21 - L23** Steel: terminology, steel classifications. Alloying elements in steel.
- › **L24 - L26** Characteristics and classification of aluminum alloys and copper alloys.
- › **L27 - L30** Characteristics and classification of magnesium and titanium alloys.

LABORATORY

- › **Lab1 - Lab4** Health and safety training; Crystallographic aspects of the metallic state, the crystallization process of a metallic material .
- › **Lab5 - Lab8** Diagrams of phase equilibrium of alloys - preparation methodology - theoretical and practical aspects.
- › **Lab 9, 10** Research on the physicochemical properties of iron alloys.
- › **Lab 11, 12** Research on the physical and chemical properties of copper alloys.
- › **Lab 13 - Lab15** Research on the physical and chemical properties of aluminum alloys.
- › **Lab 16 - Lab19** Research on mechanical properties of metallic materials.
- › **Lab 20 - Lab22** Microstructural studies of iron alloys.

- › **Lab 23 - Lab25** Microstructural examination of copper alloys.
- › **Lab 23 - Lab25** Microstructural examination of aluminum alloys.
- › **Lab 26 - Lab28** Microstructural studies of magnesium and titanium alloys.
- › **Lab 29, 30** Assessment test.

BASIC REFERENCES

1. K. Przybyłowicz, S. Skrzypek, Inżynieria metali i technologie materiałowe, Dom Wydawniczy PWN, 2020 r.
2. K. Przybyłowicz, Strukturalne aspekty odkształcania metali, Wydawnictwo Naukowe PWN, 2018 r.
3. L. A. Dobrzański, Metaloznawstwo z podstawami nauki o materiałach, WNT, 1996 r.
4. L. Dobrzański, Podstawy nauki o materiałach i metaloznawstwo, WNT 2002 r.
5. M. Blicharski, Wstęp do inżynierii materiałowej, WNT Warszawa 1998 r.
6. K. Przybyłowicz, Podstawy teoretyczne metaloznawstwa, WNT Warszawa 1999 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. M.F. Ashby, D.R.H. Jones, Materiały inżynierskie, t. I i II, tłum. ang. WNT, Warszawa, 1995/1996 r.
2. S. Rudnik, Metaloznawstwo, PWN, Warszawa, 1996 r.
3. S. Prowans, Metaloznawstwo, PWN, Warszaw, 1988 r.
4. J. Iwaszko, K. Kudła, Microstructure, hardness, and wear resistance of AZ91 magnesium alloy produced by friction stir processing with air-cooling, International Journal of Advanced Manufacturing Technology, 116, 1309 - 1323 (2021).
5. J. Iwaszko, K. Kudła, Surface remelting treatment of 7075 aluminum alloy – microstructural and technological aspect, 2020 Mater. Res. Express 7, 016523,
6. J. Iwaszko, K. Kudła Friction Stir Processing of Copper, Proc. of 28th International Conference on Metallurgy and Materials (METAL 2019), Brno, 2019 r., 1051-1056.
7. J. Iwaszko, Microstructural aspects of laser surface treatment of commercially pure (CP) titanium, Kovove Mater. 57 2019 11–18, DOI: 10.4149/km 2019.

LEARNING OUTCOMES

- › **EU1** knows what a metal and metal alloy are, what their properties and structure are, has theoretical knowledge of terminology and the theory of the metallic state.
- › **EU2** has knowledge of plastic deformation and recrystallization of metals and the influence of deformation on the properties of metallic materials.
- › **EU3** knows how to prepare diagrams of phase equilibria and can analyze them, can discuss the Fe-Fe₃C diagram, know the basic transformations and division of alloys according to the Fe-Fe₃C diagram.
- › **EU4** has knowledge of the classification, properties and application of metals and non-ferrous alloys as well as steel and cast irons.

TEACHING TOOLS

- › Lecture with the use of audiovisual aids.
- › Laboratory - research and measurement equipment, test stands.

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

- › **F1.** Assessment of the implementation of tasks included in the curriculum.
- › **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 during lectures – exam.

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	2	0,08
Exam	2	0,08
Total contact hours	64	2,56

Student's own work		
Getting acquainted with the indicated literature	28	1,12
Preparation for seminar		
Preparation for classes		
Preparation for lab	27	1,08
Project preparation		
Consultation	4	0,16
Preparation for the exam	27	1,08
Total student's own work	86	3,44
Total number of hours/ ECTS points for the course	150	6,0

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_W04, K_U03, K_K02,	C1, C2	L1 - L12 Lab1 - Lab4	F1, F2, P1
EU 2	K_W04, K_U03, K_K02,	C1, C2	L13, L14	F1, P1
EU3	K_W04, K_U03, K_K02,	C1, C2	L15 - L20 Lab5 - Lab8	F1, F2, P1
EU4	K_W04, K_U03, K_K02,	C1, C2	L21 - L30 Lab9 - Lab30	F1, F2, P1

FORM OF ASSESSMENT - DETAILS

EU1 the student knows what a metal and metal alloy are, what their properties and structure are, has theoretical knowledge of terminology and the theory of the metallic state

- › 2,0 The student does not know what a metal and metal alloy are, what their properties and structure are, the student does not have theoretical knowledge of terminology and the theory of the metallic state.
- › 3,0 The student has a basic knowledge of metals, alloys and their properties, structure and the theory of the metallic state.
- › 3,5 The student has mastered the knowledge to an almost good degree about what a metal and a metal alloy are, what properties and structure they have, as well as the terminology and theory of the metallic state.
- › 4,0 The student has mastered the knowledge to a good degree about what is a metal and a metal alloy and what are their main properties and structure, as well as terminology and theory of the metallic state.
- › 4,5 The student has almost very well mastered the knowledge of metal and metal alloy, their properties and structure, as well as the terminology and theory of the metallic state.
- › 5,0 The student has a very good knowledge of what a metal and a metal alloy are, what their properties and structure are, as well as the terminology and theory of the metallic state.

EU2 has knowledge of plastic deformation and recrystallization of metals and the influence of deformation on the properties of metallic materials.

- › 2,0 The student has no knowledge of plastic deformation and recrystallization of metals and how deformation affects the properties, does not know the research methodology.
- › 3,0 The student has a basic knowledge of plastic deformation and recrystallization of metals and how deformation affects the properties, briefly knows the research methodology.
- › 3,5 The student has acquired an almost good knowledge of plastic deformation and recrystallization of metals and how deformation affects the properties.

- › 4,0 The student has a good command of the knowledge of plastic deformation and recrystallization of metals and the influence of deformation on the properties of metallic materials.
- › 4,5 The student has almost very well mastered the knowledge of plastic deformation and recrystallization of metals and how deformation affects the properties.
- › 5,0 The student has very good knowledge of plastic deformation and recrystallization of metals and how deformation affects the properties, knows the research methodology very well.

EU3 knows how to prepare phase equilibrium diagrams and can analyze them, can discuss the Fe-Fe₃C diagram, knows the basic transformations and division of alloys according to the Fe-Fe₃C diagram.

- › 2,0 The student does not know how to prepare phase equilibrium diagrams and is not able to analyze them, cannot discuss the Fe-Fe₃C diagram, does not know the basic transformations and division of alloys according to the Fe-Fe₃C diagram.
- › 3,0 The student has a basic knowledge of the methodology of preparing phase equilibrium diagrams, can briefly discuss the Fe-Fe₃C diagram, basic transformations and division of alloys according to the Fe-Fe₃C diagram.
- › 3,5 The student has an almost good knowledge of the methodology of the preparation of phase equilibrium diagrams, and can describe the Fe-Fe₃C diagram, basic transformations and division of alloys according to the Fe-Fe₃C diagram to an almost good degree.
- › 4,0 The student has mastered the knowledge of the methodology of preparing phase equilibrium diagrams, is able to describe the Fe-Fe₃C diagram, basic transformations and division of alloys according to the Fe-Fe₃C diagram.
- › 4,5 The student has almost very well mastered the knowledge of the methodology of preparing phase equilibrium diagrams, can almost very well discuss the Fe-Fe₃C diagram, basic transformations and division of alloys according to the Fe-Fe₃C diagram.
- › 5,0 The student has mastered the knowledge of the methodology of preparing phase equilibrium diagrams, can precisely discuss the Fe-Fe₃C diagram, basic transformations and division of alloys according to the Fe-Fe₃C diagram.

EU4 has knowledge of the classification, properties and application of metals and alloys of non-ferrous metals as well as steel and cast irons.

- › 2,0 The student has no knowledge of the classification, properties and application of metals and non-ferrous alloys, as well as steels and cast irons.
- › 3,0 The student has only a basic knowledge of the classification, properties and application of metals and non-ferrous metal alloys as well as steel and cast iron
- › 3,5 The student has an almost good knowledge of the classification, properties and application of metals and alloys of non-ferrous metals as well as of steels and cast irons.
- › 4,0 The student correctly uses the knowledge and solves the problems arising during the exercises on his/her own.
- › 4,5 The student has almost very well mastered the theoretical and practical knowledge on the classification, properties and application of metals and non-ferrous metal alloys as well as steel and cast iron.
- › 5,0 The student has mastered the theoretical and practical knowledge of the classification, properties and application of metals and non-ferrous metal alloys as well as steel and cast irons.

Polish course name	MATERIAŁY CERAMICZNE
English course name	CERAMIC MATERIALS
Course code	WIP-MDL-D1-CM-03
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	3
Number of ECTS points	4
Ways of assessment	Test

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
30			30	

TEACHERS:

Dr inż. Małgorzata Lubas.

COURSE OBJECTIVES:

- › **C1** To acquaint students with the internal structure of ceramics, properties of ceramic materials, their division and application.
- › **C2** To provide students with knowledge of manufacturing techniques for traditional and modern ceramic materials and the raw materials used for this purpose.
- › **C3** To acquaint students with the methods of testing ceramic materials.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. The student knows the basics in physics, mathematics, chemistry and the basic of science of the structure of matter.
2. The student skillfully: uses mathematical operations to solve the tasks set, uses various sources of information, instructions, technical documentation, correctly interprets and presents the results obtained from the laboratory exercises conducted.

3. The student knows the principles of occupational safety in the use of machinery and technical equipment, works independently and in a group.

COURSE CONTENT

LECTURE

- › **L1** General characteristics of the ceramic industry - historical development in Poland and the world.
- › **L2, 3** Ceramic materials - characteristics of structure and properties. Comparison with other engineering materials.
- › **L4, 5** Basic ceramic raw materials - criteria for classification and requirements that they must meet.
- › **L6, 7** Types of ceramic masses. Methods of preparation, enrichment and processing.
- › **L8, 9** Production of ceramic products - general scheme. Example technologies.
- › **L10, 11** Characteristics of selected groups of ceramic materials (refractory mats, building ceramics...).
- › **L12, 13** Glass - material of the ceramic industry.
- › **L14** Raw materials of glassmaking. Properties and applications of glasses.
- › **L15** Modern ceramic materials and technologies of their production.

LABORATORY

- › **Lab 1** Health and safety training and discussion of the rules of the course credit.
- › **Lab 2** Macroscopic and microscopic analysis of basic ceramic raw materials.
- › **Lab 3, 4** Design of ceramic masses.
- › **Lab 5** Manufacturing of ceramic masses.
- › **Lab 6, 7** Forming of ceramic products.
- › **Lab 8** Drying and firing of ceramic products.
- › **Lab 9** Glazing, decoration, processing of ceramic products.
- › **Lab 10 - Lab13** Testing of selected properties of ceramic materials.
- › **Lab 14, 15** Technological processes of production of selected ceramic materials - field classes, colloquium.

BASIC REFERENCES

1. P. Wyszomirski, Wybrane naturalne i wtórne surowce mineralne, Wyd. Akapit, 2021 r.

2. P. Wyszomirski, K. Galos, Surowce mineralne i chemiczne przemysłu ceramicznego, Kraków, Uczelniane Wydaw. Nauk.-Dydakt. AGH im. S. Staszica, 2007 r.
3. S. Jusupow, Technologia Produkcji Wyrobów Ceramicznych, Wyd. Nasza wiedza, 2021 r., j. ang.
4. K. Subotowicz, Ceramika dla każdego, Wydawnictwo: Katowice ELAMED, 2008 r.
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6. R. Pampuch, Współczesne materiały ceramiczne, Wyd. Nauk.-Dydakt. AGH 2005 r.
7. M. Kordek, Ceramika szlachetna i techniczna, Wyd. AGH 2001 r.
8. M. Kaczorowski, A. Krzyńska, Konstrukcyjne materiały metalowe, ceramiczne i kompozytowe, Wyd. Oficyna Wyd. PW - Skrypt PW, 2019 r.
9. A. Olszyna, Ceramika supertwarda, Wyd. Oficyna Wyd. PW, 2011 r.
10. M. Ciecińska, D. Dorosz, E. Greiner - Wrona i inni, Technologia szkła, Właściwości fizykochemiczne, Metody Badań, Cz.1, 2, Pol. Towarzystwo Ceramiczne, PKNC, Vol 73, 2002 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. A. Jastrzębska, M. Kostecki, A. Olszyna i inni, Tworzywa ceramiczne. Ćwiczenia laboratoryjne, Wyd. Oficyna PW., 2020 r.
2. J. Mastalska-Popławska, A. Stempkowska, Ł. Wójcik, Elementy reologii w technologii ceramiki, Wyd. AGH, 2022 r.
3. Pampuch, K. Haberko, M. Kordek, Nauka o procesach ceramicznych, PWN Warszawa 1992 r.

LEARNING OUTCOMES

- › **EU1** The student has theoretical knowledge of the internal structure, properties and applications of ceramic materials.
- › **EU2** Knows basic ceramic raw materials and techniques for manufacturing ceramic materials.

- › **EU3** Knows the testing techniques and can examine the basic properties of raw materials and ceramic materials and prepare reports on selected exercises.

TEACHING TOOLS

- › Multimedia presentations.
- › Laboratory equipment and guides.

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

- › **F1.** Evaluation of the tasks covered by the curriculum.
- › **F2.** Evaluation of mastery of the learning material covered by the laboratory - colloquium.
- › **P1.** Evaluation of mastery of the teaching material covered in the lectures – colloquium.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures	30	1,2
Seminar		
Classes	30	1,2
Laboratory		
Project		
Test		
Exam		
Total contact hours	60	2,4
Student's own work		
Getting acquainted with the indicated literature	10	0,4
Preparation for seminar		
Preparation for classes	15	0,6
Preparation for lab		
Project preparation		
Consultation	4	0,16
Preparation for the test	11	0,44
Total student's own work	40	1,60

Total number of hours/ ECTS points for the course	100	4,0
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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_W03, K_W04, K_U03, K_U04, K_U05, K_K01, K_K02, K_K04,	C1, C2, C3	L1 - L15 Lab1 - Lab15	F1, F2, P1
EU 2	K_W01, K_W03, K_W04, K_U03, K_U04, K_U05, K_K01, K_K02, K_K04,	C1, C2, C3	L1 - L15 Lab1 - Lab15	F1, F2, P1
EU 3	K_K01, K_K02, K_K04,	C3	Lab1 - Lab15	F1, F2

FORM OF ASSESSMENT - DETAILS

EU1 The student has knowledge of the internal structure, properties and applications of ceramic materials.

- › 2,0 The student has not mastered the basic knowledge of internal structure, properties and application of ceramic materials.
- › 3,0 The student has partially (sufficiently) mastered the knowledge of internal structure, properties and application of ceramic materials.
- › 3,5 The student has almost mastered the knowledge of internal structure, properties and application of ceramic materials.
- › 4,0 The student has well mastered the knowledge of internal structure, properties and application of ceramic materials.
- › 4,5 The student has almost very well mastered the knowledge of internal structure, properties and application of ceramic materials.
- › 5,0 The student has mastered the knowledge of internal structure, properties and application of ceramic materials very well.

EU2 The student knows the basic ceramic raw materials and techniques for manufacturing ceramic materials.

- › 2,0 The student does not know the basic ceramic raw materials and techniques of production of ceramic materials.
- › 3,0 The student has partially mastered the knowledge of basic ceramic raw materials and techniques of production of ceramic materials.
- › 3,5 The student has almost mastered the knowledge of basic ceramic raw materials and techniques of manufacturing ceramic materials.
- › 4,0 The student has well mastered the knowledge of basic ceramic raw materials and techniques of manufacturing ceramic materials.
- › 4,5 The student almost very well mastered the knowledge of basic ceramic raw materials and techniques of manufacturing ceramic materials.
- › 5,0 The student has mastered very well the knowledge of basic ceramic raw materials and techniques of manufacturing ceramic materials.

EU 3 The student knows the research techniques and is able to investigate the basic properties of raw materials and ceramic materials and prepare reports on selected exercises.

- › 2,0 The student does not know the research techniques and is not able to examine the basic properties of raw materials and ceramic materials and develop reports on selected exercises.
- › 3,0 The student has partially mastered the research techniques and is partially able to investigate the basic properties of raw materials and ceramic materials and prepare reports on selected exercises.
- › 3,5 The student has almost mastered the research techniques and is almost able to investigate the basic properties of raw materials and ceramic materials and prepare reports on selected exercises.
- › 4,0 The student has mastered the research techniques well and is able to investigate the basic properties of raw materials and ceramic materials and develop reports of selected exercises well.
- › 4,5 The student has almost very well mastered the research techniques and is able to investigate the basic properties of raw materials and ceramic materials and almost very well able to develop reports of selected exercises.
- › 5,0 The student has mastered the research techniques very well and is able to investigate the basic properties of raw materials and ceramic materials and is able to prepare reports of selected exercises very well.

Polish course name	ZARZĄDZANIE STRATEGICZNE
English course name	STRATEGIC MANAGEMENT
Course code	WIP-MDL-D1-SM-03
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	3
Number of ECTS points	4
Ways of assessment	Exam

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15		30		

TEACHERS:

Dr hab. inż. Rafał Prusak, prof. PCz.,

Dr inż. Marzena Ogórek,

Dr inż. Dominika Strycharska.

COURSE OBJECTIVES:

- › **C1** Providing students with knowledge about the processes of market segmentation and proper product positioning.
- › **C2** Acquainting students with the issues of effective enterprise management in changing environmental conditions.
- › **C3** Acquisition of practical skills by students in carrying out strategic analyzes of the company and its environment.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Knowledge of economics in terms of the concepts of the market and market economy, models of market competition and micro - and macroeconomic equilibrium.
2. Knowledge of commercial law in the field of commercial law companies as well as competition and consumer protection.

3. Knowledge in the field of marketing in the field of the marketing information system and the behavior of buyers.
4. Knowledge of finance and accounting in the field of financing and investment rules as well as foreign capital and its acquisition.
5. Ability to work independently and in a group.

COURSE CONTENT

LECTURE

- › **L1** The essence of the company's strategy - main trends and schools of strategic management, vision, mission, goals and tasks of strategic management.
- › **L2** Analysis of the competitive environment.
- › **L3** Strategies of enterprise development - levels of strategic management, criteria and types of strategies, basic strategies of enterprise competing.
- › **L4** Models of making a profit.
- › **L5** The impact of globalization processes on strategic management of enterprises.
- › **L6** Minimizing the risk of running a business as a result of the use of diversification and strategic alliances.
- › **L7** Positioning of products on the market and strategic use of available resources.
- › **L8, L9** Analysis of the macro-environment.
- › **L10, L11** Sectoral analysis.
- › **L12, L13** Analysis of the company's potential.
- › **L14, L15** Analysis of the strategic position.

CLASSES

- › **C1, C2** Scoring the attractiveness of the sector.
- › **C3 - C8** Analysis of the bargaining power of the enterprise and the impact of the intensity of competition and substitution threat on the company's ability to conduct business.
- › **C9 - C12** Analysis of the state of the company's environment with the use of the scenario method.
- › **C13** Assessment of the market position of strategic business units using portfolio methods.

- › **C14 - C17** Analysis of the company's competition with the use of a map of strategic groups.
- › **C18** Analysis of the company's competitive potential with the use of the analysis of key success factors.
- › **C19 - C22** Monitoring the company's strategy with the use of a strategic scorecard.
- › **C23 - C26** Analysis of the company's strategic position using the SPACE method.
- › **C27 - C30** Using the SWOT analysis to assess the level of strategic management in the company.

BASIC REFERENCES

1. Ciszewska - Mlinaric M., Obłój K., Wąsowska A.: Strategia korporacji, Wolters Kluwer, Warszawa 2015 r.
2. De Wit B., Meyer R.: Synteza strategii, PWE, Warszawa 2007 r.
3. Gierszewska G., Romanowska M.: Analiza strategiczna przedsiębiorstwa, wyd.4, PWE, Warszawa 2016 r.
4. Grant R. M.: Współczesna analiza strategii, Oficyna Wolters Kluwer Business, Warszawa 2011 r.
5. Kaplan R.S., Norton D. P.: Wdrażanie strategii dla osiągnięcia przewagi konkurencyjnej, Wydawnictwa Profesjonalne PWN, Warszawa 2010 r.
6. Obłój K.: Strategia organizacji. W poszukiwaniu trwałej przewagi konkurencyjnej, PWE, Warszawa 2007 r.
7. Porter M.: Pięć sił konkurencyjnych kształtujących strategię, Harvard Business Review Polska, Lipiec-Sierpień 2008 r.
8. Romanowska M.: Planowanie strategiczne w przedsiębiorstwie, Polskie Wydawnictwo Ekonomiczne, Warszawa 2004 r.
9. Stabryła A.: Zarządzanie strategiczne w teorii i praktyce firmy, PWN, Warszawa 2000 r.
10. Urbanowska-Sojkin, E.: Ryzyko w wyborach strategicznych w przedsiębiorstwach, PWE, Warszawa, 2013 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. Griffin R.W.: Podstawy zarządzania organizacjami, Wydawnictwo Naukowe PWN, Warszawa 2006 r.
2. Drucker P. F.: Zarządzanie w XXI wieku, Muza SA, Warszawa 2000 r.
3. Prusak R.: Kształtowanie struktury kapitału intelektualnego przedsiębiorstwa, Politechnika Częstochowska, Prace Naukowe Wydziału Inżynierii Procesowej, Materiałowej i Fizyki Stosowanej, Seria: Monografie Nr 34, Częstochowa 2013 r.

LEARNING OUTCOMES

- › **EU1** The student has the knowledge that allows him to indicate the factors influencing the strategic potential of the enterprise and the level of intensity of the competitive struggle.
- › **EU2** The student is able to perform a basic analysis of the state of the company's environment and its impact on the possibilities of operation in a practical way.
- › **EU3** The student knows the methods and techniques used in strategic analysis and is able to match the appropriate technique to the assumed goal.

TEACHING TOOLS

- › Multimedia presentations.
- › CUT e-learning platform (possible use).

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

- › **F1.** Assessment of knowledge in the field of basic concepts in the field of organization and business management.
- › **F2.** Assessment of self-preparation of exercises.
- › **P1.** Test.
- › **P2.** Exam.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures	15	0,6
Seminar		
Classes	30	1,2
Laboratory		
Project		
Test	2	0,08
Exam	2	0,08
Total contact hours	49	1,96
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	4	0,16
Preparation for the test/exam	17	0,68
Total student's own work	51	2,04
Total number of hours/ ECTS points for the course	100	4,0

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_W07, K_U07, K_K02,	C1, C2, C3	L1 - L15 C1 - C30	F1, F2 P1, P2
EU 2	K_W07, K_U07, K_K02,	C1, C2, C3	L2, L7 - L15 C4 - C30	F1, F2 P1, P2
EU 3	K_W07, K_U07, K_K02,	C1, C2, C3	L2, L7 - L15 C4 - C30	F1, F2 P1, P2

FORM OF ASSESSMENT - DETAILS

EU1 The student has the knowledge enabling him to indicate the factors influencing the strategic potential of the enterprise and affecting the level of intensity of the competitive struggle.

- › 2,0 The student does not have the knowledge enabling him to indicate the factors influencing the strategic potential of the enterprise and the level of intensity of the competitive struggle.
- › 3,0 The student has the knowledge enabling him to indicate the factors influencing the strategic potential of the enterprise and sufficiently influencing the level of intensity of the competitive struggle.
- › 3,5 The student has the knowledge enabling him to indicate the factors influencing the strategic potential of the enterprise and influencing the intensity of the competitive struggle to a satisfactory plus degree.
- › 4,0 The student has the knowledge enabling him to indicate the factors influencing the strategic potential of the enterprise and influencing the level of intensity of the competitive struggle to a good degree.

- › 4,5 The student has the knowledge enabling him to indicate the factors influencing the strategic potential of the enterprise and influencing the level of intensity of the competitive struggle to a good plus degree.
- › 5,0 The student has the knowledge enabling him to indicate the factors influencing the strategic potential of the enterprise and influencing the level of intensity of the competitive struggle to a very good degree.

EU2 The student is able to perform a basic analysis of the state of the company's environment and its impact on the possibilities of operation in a practical way.

- › 2,0 The student is not able to perform a basic analysis of the state of the company's environment and its impact on the possibilities of operation.
- › 3,0 The student is able to perform a basic analysis of the state of the company's environment and its impact on the possibilities of operation to a satisfactory degree.
- › 3,5 The student is able to perform a basic analysis of the state of the company's environment and its impact on the possibilities of operation to a satisfactory plus degree.
- › 4,0 The student is able to carry out a practical basic analysis of the state of the company's environment and its impact on the possibilities of operation to a good degree.
- › 4,5 The student is able to carry out a practical basic analysis of the state of the company's environment and its impact on the possibilities of operation to a good plus degree.
- › 5,0 The student is able to perform a basic analysis of the state of the company's environment and its impact on the possibilities of operation to a very good degree.

EU 3 The student knows the methods and techniques used in strategic analysis and is able to match the appropriate technique to the assumed goal.

- › 2,0 The student does not know the methods and techniques used in strategic analysis and is not able to match the appropriate technique to the assumed goal.
- › 3,0 The student knows the methods and techniques used in strategic analysis and is able to adjust the appropriate technique to the assumed goal sufficiently.

- › 3,5 The student knows the methods and techniques used in strategic analysis and is able to match the appropriate technique to the assumed goal to a satisfactory plus degree.
- › 4,0 The student knows the methods and techniques used in strategic analysis and is able to match the appropriate technique to the assumed goal to a good degree.
- › 4,5 The student knows the methods and techniques used in strategic analysis and is able to match the appropriate technique to the assumed goal to a good plus degree.
- › 5,0 The student knows the methods and techniques used in strategic analysis and is able to match the appropriate technique to the assumed goal to a very good degree.

Polish course name	BAZY DANYCH I DATA MINING
English course name	DATABASES AND DATA MINING
Course code	WIP-MDL-D1-DADM-03
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	3
Number of ECTS points	3
Ways of assessment	Test

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
			30	

TEACHERS:

Dr hab. inż. Adam Cwudziński, prof. PCz.,

Dr inż. Szymon Berski,

Dr inż. Artur Hutny,

Dr hab. inż. Marek Warzecha, prof. PCz.

COURSE OBJECTIVES:

- › **C1** Providing students with knowledge in the field of databases.
- › **C2** Obtaining by the students the practical skills in the field of creating and application databases.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Basic knowledge of computer science.
2. Ability to work independently and in a group.
3. Ability to use literature sources and internet resources.

COURSE CONTENT

LABORATORY

- › **Lab1, Lab2** Database systems.
- › **Lab3, Lab4, Lab5, Lab6** Object-oriented database model.
- › **Lab7, Lab8, Lab9, Lab10** Relational database model.
- › **Lab11, Lab12, Lab13, Lab14** Structured query language.
- › **Lab15, Lab16, Lab17, Lab18** SQL complex instructions.
- › **Lab19, Lab20, Lab21, Lab22** Database management system - MySQL.
- › **Lab23, Lab24, Lab25, Lab26** Macros - application generators for database.
- › **Lab27, Lab28, Lab29, Lab30** Introduction to Visual basic language.

BASIC REFERENCES

1. Viescas, J.: Podręcznik Microsoft Access 2000, Wyd. RM, Warszawa, 2000 r.
2. Jewtuszenko O., Trochimczuk R.: Praktyczne wprowadzenie do relacyjnych baz danych, Wyd. Politechniki Białostockiej, Białystok, 2010 r.
3. Pękała, B.: Bazy danych - teoria i praktyka, Wyd. Uniwersytetu Rzeszowskiego, Rzeszów, 2015 r.
4. Schamkant B. Navathe, Ramez Elmasri: Wprowadzenie do systemów baz danych, Helion 2005 r.
5. Whitehorn M., Marklyn B.: Relacyjne bazy danych. Helion, 2003 r.
6. Dudek W.: Bazy danych SQL. Teoria i praktyka, Helion, 2006 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. Date C. J., Darwen H.: SQL. Omówienie standardu języka, WNT 2000 r.
2. Rojek-Mikołajczak I.: Bazy danych, kurs podstawowy dla inżynierów informatyków, Wyd. Akademii Bydgoskiej, Bydgoszcz, 2004 r.

LEARNING OUTCOMES

- › **EU1** Student has knowledge in the field of relational and object-oriented database.
- › **EU2** Student is able to project and perform database.

TEACHING TOOLS

- › Laboratory with computer stations.

- › Software.

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

- › **F1.** Assessment of self-preparation for the laboratory.
- P1.** Assessment of course content – test.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures		
Seminar		
Classes		
Laboratory	30	1,2
Project		
Test	3	0,12
Exam		
Total contact hours	33	1,32
Student's own work		
Getting acquainted with the indicated literature		
Preparation for seminar		
Preparation for classes		
Preparation for lab	33	1,32
Project preparation		
Consultation	4	0,16
Preparation for the exam/test	5	0,2

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	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_W03, K_U04, K_U05, K_K02,	C1	Lab1 - Lab30	P1, F1
EU 2	K_W03, K_U04, K_U05, K_K02,	C2	Lab1 - Lab30	P1, F1

FORM OF ASSESSMENT - DETAILS

EU1 The student has knowledge of relational and object - oriented databes.

- › 2,0 The student has no knowledge of relational and object - oriented databes.
- › 3,0 The student has partially knowledge of relational and object - oriented databes.
- › 3,5 The student has almost knowledge of relational and object - oriented databes.
- › 4,0 The student has good knowledge of relational and object - oriented databes.
- › 4,5 The student has almost very good knowledge of relational and object - oriented databes.

- › 5,0 The student has very good knowledge of relational and object - oriented databases.

EU2 Student is able to project and perform database.

- › 2,0 Student is no able to project and perform database.
- › 3,0 Student is able to partially project and perform database.
- › 3,5 Student is able to almost project and perform database.
- › 4,0 Student is able to good project and perform database.
- › 4,5 Student is able to almost very good project and perform database.
- › 5,0 Student is able to very good project and perform database.

Course name in Polish	JĘZYK OBCY (ANGIELSKI)
Course name in English	FOREIGN LANGUAGE (ENGLISH)
Course code	WIP-MDL-D1-FL-03
Field of study	Materials design and logistics
Level of qualification	First cycle degree programme
Form of study	Full-time
Semester	3
ECTS	2
Method of assessment	End-of-semester assessment

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
		30		

TEACHERS:

Katarzyna Stefańczyk, MA
Wioletta Będowska, MA
Joanna Dziurkowska, MA
Małgorzata Engelking, MA
Marian Gałkowski, MA
Aleksandra Glińska, MA
Katarzyna Górniak-Cierpień, MA
Dorota Imiołczyk, MA
Aneta Kot, MA
Izabela Mishchil, MA
Monika Nitkiewicz, MA
Barbara Nowak, MA
Joanna Pabjańczyk-Musialska, MA
Dominika Rachwalik, MA
Przemysław Załęcki, MA

COURSE ACTIVITIES:

- › **C1** Practising and developing the basic language skills (listening, speaking, reading, writing) necessary to function in an international working environment and in everyday life.
- › **C2** Learning the necessary general and specialised vocabulary related to the field of study.
- › **C3** Acquiring intercultural knowledge and skills.

REQUIRED KNOWLEDGE, SKILLS, COMPETENCES:

1. Command of a foreign language at the B1 level according to CEFR (the Common European Framework of Reference for Languages).
2. Ability to work independently and in a group.
3. Ability to use various sources of information, also in a foreign language.

COURSE CONTENT

CLASSES

- › **C1, C2** Lexical-grammatical structures - placement test.
 - › **C3, C4** Self-presentation: university presentation, academic terminology, career path.
 - › **C5, C6** Specialised text.**
 - › **C7, C8** PLW* Language structures in use: communicative exercises - business contacts.
 - › **C9, C10** Social media: applying for a job - conversations.
 - › **C11, C12** PLW* - professional profile – presentation elements.
 - › **C13, C14** Functions: networking. Revision.
 - › **C15, C16** Achievement test I.
 - › **C17, C18** Lexical-grammatical structures. Communicative exercises.
 - › **C19, C20** START-UPS-successes and failures - lexical exercises.
 - › **C21, C22** PLW* Work skills: business meetings.
 - › **C23, C24** PLW* Functions - checking progress, delegating tasks.
 - › **C25, C26** Specialised text.** Revision.
 - › **C27, C28** Achievement test II.
 - › **C29, C30** Review. Individual student presentations.
- *) PLW - Professional Language in the Workplace.

***)Topics of specialised texts closely related to the characteristics and scope of the field of study.

RESOURCE MATERIALS

1. K. Harding, L. Taylor: International Express – Intermediate, OUP 2019 r.
2. K. Harding, L. Taylor: International Express - Upper- Intermediate, OUP 2019 r.
3. D. Cotton, D. Falvey, S. Kent: Market Leader – Upper-Intermediate, Pearson 2016 r.
4. J. Kern: Career Paths – Mechanical Engineering, Express Publishing 2016 r.
5. I. Dubicka, M. O’Keeffe i inni: B1+ Business Partner, Pearson 2018 r.
6. M. Ibbotson: Engineering, Technical English for Professionals CUP 2021 r.
7. I. Dubicka, M. Rosenberg i inni: B2 Business Partner, Pearson 2018 r.
8. D. Bonamy: Technical English 3/4, Pearson 2013 r.

SUPPLEMENTARY RESOURCE MATERIALS

1. V. Hollet, J. Sydes: Tech Talk OUP 2011 r.
 2. I. Williams: English for Science and Engineering, Thomson LTD 2001 r.
 3. N. Briger, A. Pohl: Technical English Vocabulary and Grammar, Summertown Publishing 2002 r.
 4. V. Evans, J. Dooley, K. Rodgers: Career Paths: Natural Resources II - Mining, Egis 2018 r.
 5. M. Ibbotson: Cambridge English for Engineering, CUP 2021 r.
 6. C. Lloyd, J. A. Frazier: Career Paths – Engineering, Express Publishing 2018 r.
 7. Aplikacje specjalistyczne: Mechanical Engineering.
 8. E. J. Williams: Presentations in English, Macmillan 2008 r.
 9. J. Dooley, V. Evans: Grammarway 2,3,4, Express Publishing 1999 oraz inne podręczniki do gramatyki.
 10. Dictionary of Contemporary English, Pearson Longman 2009 oraz inne słowniki.
 11. M. Duckworth, J. Hughes: Business Result - Upper-Intermediate, OUP 2018 r.
 12. S. Sopranzi: Flash on English for Mechanics, Electronics and Technical Assistance, Eli 2016 r.
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LEARNING OUTCOMES

- › **EU1** The student is able to use a foreign language to the extent necessary to function in a professional environment and typical everyday life situations.
- › **EU2** The student is able to read and understand a popular science text related to his/her field of study.
- › **EU3** The student is able to prepare and deliver a presentation in a foreign language using multimedia.

TEACHING TOOLS

- › General and specialised language textbooks.
- › Purpose built exercises.
- › Audiovisual exercises, multimedia presentations.
- › Internet resources, CUT e-learning platform.
- › Professional dictionaries and online dictionaries.

METHOD OF ASSESSMENT (F- FORMATIVE, S- SUMMATIVE)

- › **F1.** Grade for class preparation.
- › **F2.** Grade for class participation.
- › **F3.** Grade for the achievement test.
- › **F4.** Grade for the presentation.
- › **F5.** Grade for assignments completed in e-learning mode.
- › **P1.** End-of-semester grade*

*) a prerequisite for obtaining an end-of-semester grade is receiving passing grades in all assignments and achievement tests.

STUDENT WORKLOAD

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

Projects		
End-of-semester assessment		
Examination		
Total direct contact classes	30	1,2
Student's unassisted work		
Self-directed study of lectures		
Self-directed preparation for seminars		
Self-directed preparation for tutorials	8	0,32
Self-directed preparation for laboratories		
Self-directed preparation for projects		
Consultations	2	0,08
Preparation for the end-of-semester assessment/examination	10	0,4
Total student's unassisted work	20	0,8
Total student workload	50	2,0

SUPPLEMENTARY INFORMATION

Class times	Information on class times is available at the Office of the Centre for Foreign Languages and in USOS. Foreign language classes are held at the Centre for Foreign Languages at Czestochowa University of Technology, ul. Dąbrowskiego 69 as well as Moodle e-learning platform of Czestochowa University of Technology is used.
Consultation times	Information on consultations is provided to students during the first class of a given course, and is also placed on the website of the Centre for Foreign Languages - www.sjo.pcz.pl

MATRIX OF LEARNING OUTCOMES

Learning outcome	Reference of the given outcome to outcomes defined	Course objectives	Course content	Method of assessment
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	for the entire programme			
EU 1	K_W09, K_U01, K_U09, K_K04,	C1, C2, C3	C1 - C30	F1, F2, F3, F5, P1
EU 2	K_W09, K_U01, K_U09, K_K04,	C1, C2, C3	C5 - C6, C25 - C26	F2, F5, P1
EU 3	K_W09, K_U01, K_U09, K_K04,	C1, C2, C3	C3 - C4, C11 - C12	F1, F4, F5

LEARNING OUTCOMES EVALUATION MATRIX

EU1 The student is able to use a foreign language to the extent necessary to function in a professional environment and typical everyday life situations.

- › 2,0 The student is not able to use a foreign language and use appropriate grammatical and lexical structures in a professional environment and typical everyday life situations in both written and oral form. The student's score in the achievement test is below 60%.
- › 3,0 The student is able to use the foreign language to a very limited extent, making numerous mistakes. The student scores between 60-75% in the test.
- › 3,5 A grade of 3,5 is given when the learning outcomes for a grade of 3,0 have been fully achieved, but the student has not fully acquired the learning outcomes for a grade of 4,0.
- › 4,0 The student is able to use the foreign language correctly but occasionally makes mistakes. The student scores between 80-85% in the test.
- › 4,5 A grade of 4,5 is given when the learning outcomes for a grade of 4,0 have been fully achieved, but the student has not fully acquired the learning outcomes for a grade of 5,0.
- › 5,0 The student is able to express himself/herself fluently and spontaneously on professional and social topics and in social interactions. The student's score in the achievement test is above 91%.

EU2 The student is able to read and understand a popular science text related to his/her field of study.

- › 2,0 The student is not able to understand a popular science text he/she reads. The student's score in the reading comprehension test is below 60%.
- › 3,0 The student understands only excerpts from the text he/she reads and has difficulty interpreting it. The student scores between 60-75% in the reading comprehension test.
- › 3,5 A grade of 3,5 is given when the learning outcomes for a grade of 3,0 have been fully achieved, but the student has not fully acquired the learning outcomes for a grade of 4,0.
- › 4,0 The student understands the meaning of the main topics of the text and is able to interpret them. The student scores between 80-85% in the reading comprehension test.
- › 4,5 A grade of 4,5 is given when the learning outcomes for a grade of 4,0 have been fully achieved, but the student has not fully acquired the learning outcomes for a grade of 5,0.
- › 5,0 The student understands everything he/she reads, including details. He/she is able to accurately interpret the text in his/her own words. The student's score in the reading comprehension test is above 91%.

EU 3 The student is able to prepare and deliver a presentation in a foreign language using multimedia.

- › 2,0 The student is not able to prepare and deliver a presentation on a given topic.
- › 3,0 The student is able to prepare a presentation according to the established standards and deliver it but makes numerous language mistakes.
- › 3,5 A grade of 3,5 is given when the learning outcomes for a grade of 3,0 have been fully achieved, but the student has not fully acquired the learning outcomes for a grade of 4,0.
- › 4,0 The student is able to prepare a presentation according to the established standards and deliver it in a clear and communicative manner.
- › 4,5 A grade of 4,5 is given when the learning outcomes for a grade of 4,0 have been fully achieved, but the student has not fully acquired the learning outcomes for a grade of 5,0.
- › 5,0 The student is able to prepare a presentation according to the established standards and deliver it using rich lexis and advanced language and grammatical structures.

Course name in Polish	JĘZYK OBCY (NIEMIECKI)
Course name in English	FOREIGN LANGUAGE (GERMAN)
Course code	WIP-MDL-D1-FL-03
Field of study	Materials design and logistics
Level of qualification	First cycle degree programme
Form of study	Full-time
Semester	3
ECTS	2
Method of assessment	End-of-semester assessment

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
		30		

TEACHERS:

Mgr Henryk Juszcak,
Dr Marlena Wilk.

COURSE ACTIVITIES:

-
- › **C1** Practising and developing the basic language skills (listening, speaking, reading, writing) necessary to function in an international working environment and in everyday life.
 - › **C2** Learning the necessary general and specialised vocabulary related to the field of study.
 - › **C3** Acquiring intercultural knowledge and skills.

REQUIRED KNOWLEDGE, SKILLS, COMPETENCES:

1. Command of a foreign language at the B1 level according to CEFR (the Common European Framework of Reference for Languages).
2. Ability to work independently and in a group.
3. Ability to use various sources of information, also in a foreign language.

COURSE CONTENT

CLASSES

- › **C1, C2** Lexical - grammatical structures: placement test.
 - › **C3, C4** Self - presentation: university presentation, academic terminology, career path.
 - › **C5, C6** Specialised text.**
 - › **C7, C8** PLW* Language structures in use: communicative exercises - business contacts.
 - › **C9, C10** Social media: applying for a job - conversations.
 - › **C11, C12** PLW* Professional profile – presentation elements.
 - › **C13, C14** Functions: networking. Revision.
 - › **C15, C16** Achievement test I.
 - › **C17, C18** Lexical - grammatical structures: Communicative exercises.
 - › **C19, C20** START-UPS-successes and failures - lexical exercises.
 - › **C21, C22** PLW* Work skills: business meetings.
 - › **C23, C24** PLW* Functions - checking progress, delegating tasks.
 - › **C25, C26** Specialised text.** Revision.
 - › **C27, C28** Achievement test II.
 - › **C29, C30** Review. Individual student presentations.
- *) PLW - Professional Language in the Workplace.

**)Topics of specialised texts closely related to the characteristics and scope of the field of study.

RESOURCE MATERIALS

1. Fügert N., Grosser R., DaF im Unternehmen B1, Kurs - und Übungsbuch, Klett, 2016 r.
2. Hagner V., Schlüter S., Im Beruf neu, Hueber Verlag, 2021 r.
3. Braunert J., Schlenker W., Unternehmen Deutsch, E. Klett, Stuttgart, 2014 r.
4. Sander I., Braun B., Doubek M., DaF Kompakt D, Klett, Stuttgart, 2015 r.
5. Hilper, S., Kalender S., Kerner M., Schritte international 5, Hueber, 2012 r.
6. Guenat G., Hartmann P., Deutsch für das Berufsleben B1, E. Klett Sprachen GmbH, 2015 r.
7. Braun-Podeschwa J., Habersack Ch., Pude A., Menschen, Huber, 2018 r.
8. Funk H, Kuhn Ch., Studio B1 + kurs DVD, Cornelsen BC edu, Berlin 2012 r.

9. Bosch G., Dahmen K., Schritte international, Hueber Verlag, Ismaning, 2012 r.
10. Eismann V., Erfolgreich bei Präsentationen, Cornelsen Verlag, Berlin 2016 r.
11. R. Kärchner-Ober, Deutsch für Ingenieure B1-B2, Hueber, Warszawa 2015 r.
12. Baberadova H., Język niemiecki w ekonomii: Fremdsprache Deutsch – Finanzen B2/C1, Lektorklett, 2012 r.

SUPPLMENTARY RESOURCE MATERIALS

1. Wielki Słownik niemiecko-polski/polsko-niemiecki PONS, LektorKlett, Kraków 2010 r.
2. Corbbeil J.-C., Archambault A., Słownik obrazkowy polsko-niemiecki, Klett, Poznań 2007 r.
3. Tarkiewicz U., Deutsche Fachtexte leichter gemacht, Wydawnictwa PCz, Częstochowa 2009 r.
4. Wyszzyński J., Sehen, Hören, Verstehen – Ćwiczenia do materiałów audiowizualnych, Wyd. Politechniki Częstochowskiej, Częstochowa 2008 r.
5. Czasopisma: magazin-deutschland.de, Bildung&Wissenschaft.
6. Słowniki mono i bilingwalne, również on-linowe.
7. Aplikacje specjalistyczne oraz zasoby Internetu.

LEARNING OUTCOMES

- › **EU1** The student is able to use a foreign language to the extent necessary to function in a professional environment and typical everyday life situations.
- › **EU2** The student is able to read and understand a popular science text related to his/her field of study.
- › **EU3** The student is able to prepare and deliver a presentation in a foreign language using multimedia.

TEACHING TOOLS

- › General and specialised language textbooks.
- › Purpose built exercises.
- › Audiovisual exercises, multimedia presentations.
- › Internet resources, CUT e-learning platform.
- › Professional dictionaries and online dictionaries.

METHOD OF ASSESSMENT (F- FORMATIVE, S- SUMMATIVE)

- › **F1.** Grade for class preparation.
- › **F2.** Grade for class participation.
- › **F3.** Grade for the achievement test.
- › **F4.** Grade for the presentation.
- › **F5.** Grade for assignments completed in e-learning mode.
- › **P1.** End-of-semester grade*

*) a prerequisite for obtaining an end-of-semester grade is receiving passing grades in all assignments and achievement tests.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures		
Seminars		
Tutorials	30	1,2
Laboratories		
Projects		
End-of-semester assessment		
Examination		
Total direct contact classes	30	1,2
Student's unassisted work		
Self-directed study of lectures		
Self-directed preparation for seminars		
Self-directed preparation for tutorials	8	0,32
Self-directed preparation for laboratories		
Self-directed preparation for projects		
Consultations	2	0,08
Preparation for the end-of-semester assessment/examination	10	0,4
Total student's unassisted work	20	0,8
Total student workload	50	2,0

SUPPLEMENTARY INFORMATION

Class times	Information on class times is available at the Office of the Centre for Foreign Languages and in USOS. Foreign language classes are held at the Centre for Foreign Languages at Czestochowa University of Technology, ul. Dąbrowskiego 69 as well as Moodle e-learning platform of Czestochowa University of Technology is used.
Consultation times	Information on consultations is provided to students during the first class of a given course, and is also placed on the website of the Centre for Foreign Languages - www.sjo.pcz.pl

MATRIX OF LEARNING OUTCOMES

Learning outcome	Reference of the given outcome to outcomes defined for the entire programme	Course objectives	Course content	Method of assessment
EU 1	K_W09, K_U01, K_U09, K_K04,	C1, C2, C3	C1 - C30	F1, F2, F3, F5, P1
EU 2	K_W09, K_U01, K_U09, K_K04,	C1, C2, C3	C5 - C6, C25 - C26	F2, F5, P1
EU 3	K_W09, K_U01, K_U09, K_K04,	C1, C2, C3	C3 - C4, C11 - C12	F1, F4, F5

LEARNING OUTCOMES EVALUATION MATRIX

EU1 The student is able to use a foreign language to the extent necessary to function in a professional environment and typical everyday life situations.

- › 2,0 The student is not able to use a foreign language and use appropriate grammatical and lexical structures in a professional environment and typical

everyday life situations in both written and oral form. The student's score in the achievement test is below 60%.

- › 3,0 The student is able to use the foreign language to a very limited extent, making numerous mistakes. The student scores between 60-75% in the test.
- › 3,5 A grade of 3,5 is given when the learning outcomes for a grade of 3,0 have been fully achieved, but the student has not fully acquired the learning outcomes for a grade of 4,0.
- › 4,0 The student is able to use the foreign language correctly but occasionally makes mistakes. The student scores between 80-85% in the test.
- › 4,5 A grade of 4,5 is given when the learning outcomes for a grade of 4,0 have been fully achieved, but the student has not fully acquired the learning outcomes for a grade of 5,0.
- › 5,0 The student is able to express himself/herself fluently and spontaneously on professional and social topics and in social interactions. The student's score in the achievement test is above 91%.

EU2 The student is able to read and understand a popular science text related to his/her field of study.

- › 2,0 The student is not able to understand a popular science text he/she reads. The student's score in the reading comprehension test is below 60%.
- › 3,0 The student understands only excerpts from the text he/she reads and has difficulty interpreting it. The student scores between 60-75% in the reading comprehension test.
- › 3,5 A grade of 3,5 is given when the learning outcomes for a grade of 3,0 have been fully achieved, but the student has not fully acquired the learning outcomes for a grade of 4,0.
- › 4,0 The student understands the meaning of the main topics of the text and is able to interpret them. The student scores between 80-85% in the reading comprehension test.
- › 4,5 A grade of 4,5 is given when the learning outcomes for a grade of 4,0 have been fully achieved, but the student has not fully acquired the learning outcomes for a grade of 5,0.
- › 5,0 The student understands everything he/she reads, including details. He/she is able to accurately interpret the text in his/her own words. The student's score in the reading comprehension test is above 91%.

EU 3 The student is able to prepare and deliver a presentation in a foreign language using multimedia.

- › 2,0 The student is not able to prepare and deliver a presentation on a given topic.
- › 3,0 The student is able to prepare a presentation according to the established standards and deliver it but makes numerous language mistakes.
- › 3,5 A grade of 3,5 is given when the learning outcomes for a grade of 3,0 have been fully achieved, but the student has not fully acquired the learning outcomes for a grade of 4,0.
- › 4,0 The student is able to prepare a presentation according to the established standards and deliver it in a clear and communicative manner.
- › 4,5 A grade of 4,5 is given when the learning outcomes for a grade of 4,0 have been fully achieved, but the student has not fully acquired the learning outcomes for a grade of 5,0.
- › 5,0 The student is able to prepare a presentation according to the established standards and deliver it using rich lexis and advanced language and grammatical structures.

Polish course name	METODY STATYSTYCZNE W NAUKACH INŻYNIERSKICH
English course name	STATISTICAL METHODS IN ENGINEERING SCIENCES
Course code	WIP-MDL-D1-SMIES-03
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	3
Number of ECTS points	3
Ways of assessment	Test

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15		15		

TEACHERS:

Dr inż. Edyta Kardas,

Dr inż. Rafał Wyczółkowski,

Dr inż. Sławomir Morel.

COURSE OBJECTIVES:

- › **C1** Provide students with knowledge in the field of conducting statistical research, allowing them to make decisions related to various problems.
- › **C2** Acquainting students with statistical measures and methods of mass phenomena analysis in engineering sciences.
- › **C3** Acquiring practical skills in using statistical methods to solve various analytical and research problems in engineering sciences.

**PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER
COMPETENCES:**

1. Basic knowledge of mathematics and economics.
2. Basic knowledge of the probability calculus.

3. Average mastery of the rules for processing data from research, eg social, technical-production or scientific.
4. Ability to work independently and in a group.
5. Ability to use an engineering calculator.
6. Ability to use literature and internet resources.

COURSE CONTENT

LECTURE

- › **L1** Characteristics of the statistical research process. Stages of statistical research.
- › **L2, L3** Determining the values of measures of the distribution of a feature in a sample, including the measures of position, differentiation, asymmetry and concentration.
- › **L4** The use of descriptive statistics methods in engineering sciences.
- › **L5, L6, L7** Random variable and basic distributions of random variables. Exact and boundary distributions of sample statistics.
- › **L8, L9** Point and interval estimation. Determining the minimum number of measurements in relation to the postulate of representativeness of the statistical sample.
- › **L10** The use of interval estimation methods in engineering sciences.
- › **L11, L12, L13** Parametric tests in the verification of statistical hypotheses expressed by the arguments of classical data distributions or structure indexes. Nonparametric tests of verification of statistical hypotheses.
- › **L13, L14** The use of hypothesis verification theory methods in engineering sciences.
- › **L15** Computer statistical packages used in engineering statistics.

CLASSES

- › **C1, C2** Acquainting students with the rules of passing the course. Designing a statistical survey. Collection and presentation of statistical data.
- › **C3, C4** The use of descriptive statistics methods to analyse engineering problems.
- › **C5, C6** Analysis of engineering problems with the use of basic statistical distributions.

- › **C7, C8** Analysis of engineering problems using exact and boundary distributions of sample statistics.
- › **C9, C10** Estimation of parameters of the general population on the basis of a statistical sample. The minimum sample size for the assumed measurement accuracy.
- › **C11, C12** The use of selected parametric tests in engineering sciences.
- › **C13, C14** The use of selected non-parametric tests in engineering sciences.
- › **C15** The use of the knowledge of sample statistical calculations - test.

BASIC REFERENCES

1. M. Sobczyk: Statystyka, PWN Warszawa 2021 r.
2. S. Ostasiewicz, Z. Rusnak, U. Siedlecka: Statystyka. Elementy teorii i zadania, Wydawnictwo Akademii Ekonomicznej we Wrocławiu, Wrocław 1998 r.
3. E. Sojka: Statystyka w przykładach i zadaniach, Wydawnictwo Wyższej Szkoły Zarządzania i Nauk Społecznych w Tychach, Tychy 2003 r.
4. E. Nowak (red.): Metody statystyczne w działalności przedsiębiorstwa, Polskie Wydawnictwo Ekonomiczne, Warszawa 2001 r.
5. Suchecka J. (red.): Metody statystyczne. Zarys teorii i zadania, Wydawnictwo Wydziału Zarządzania Politechniki Częstochowskiej, Częstochowa 2002 r.
6. Krysicki W.: Statystyka matematyczna, Rachunek prawdopodobieństwa i statystyka matematyczna w zadaniach, PWN, Warszawa 1986 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. M. Balcerowicz - Szkutnik, W. Szkutnik: Podstawy statystyki w przykładach i zadaniach. Cz. I.: Statystyka opisowa, Wydawnictwo Śląskiej Wyższej Szkoły Zarządzania im. Gen. Jerzego Ziętka w Katowicach, Katowice 2009 r.
2. M. Balcerowicz - Szkutnik, W. Szkutnik: Podstawy statystyki w przykładach i zadaniach. Cz. II.: Elementy rachunku prawdopodobieństwa i wnioskowania statystycznego, Wydawnictwo Śląskiej Wyższej Szkoły Zarządzania im. Gen. Jerzego Ziętka w Katowicach, Katowice 2009 r.

LEARNING OUTCOMES

- › **EU1** The student has a basic knowledge of various tools related to descriptive statistics and is able to characterize a community with their use.

- › **EU2** The student has a basic knowledge of various tools related to mathematical statistics and statistical inference and is able to use this knowledge to estimate and verify hypotheses of parameters of the general population.
- › **EU3** The student is able to make a statistical analysis with the selection of appropriate tools for a given research problem.

TEACHING TOOLS

- › Multimedia presentations.
- › Exercises - problem solving with the help of the teacher.
- › Laboratory equipment and guides.
- › Computer stations with software.

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

- › **F1.** Assessment of preparation for exercises.
- › **F2.** Assessment of the ability to apply the acquired knowledge during exercises.
- › **F3.** Assessment of activity during classes.
- › **P1.** Assessment of the mastery of the teaching material being the subject of exercises - final 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		
Exam		
Total contact hours	30	1,2
Student's own work		
Getting acquainted with the indicated literature	17	0,68
Preparation for seminar		
Preparation for classes	20	0,8

Preparation for lab		
Project preparation		
Consultation	4	0,16
Preparation for the test	4	0,16
Total student's own work	45	1,8
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_W01, K_W03, K_U04, K_U05, K_K02,	C1, C2, C3	L1 - L4, L15 C1 - C4, C15	F1 - F3, P1
EU 2	K_W01, K_W03, K_U04, K_U05, K_K02,	C1, C2, C3	L5 - L15 C5 - C15	F1 - F3, P1
EU 3	K_W01, K_W03, K_U04,	C1, C2, C3	L1 - L15 C1 - C15	F1 - F3, P1

	K_U05, K_K02,			
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FORM OF ASSESSMENT - DETAILS

EU1 The student has a basic knowledge of various tools related to descriptive statistics and is able to characterize a community with their use.

- › 2,0 The student has not any basic knowledge of various tools related to descriptive statistics and is able to characterize a community with their use.
- › 3,0 The student has a basic knowledge of various tools related to descriptive statistics and is able to characterize a community with their use at minimum level.
- › 3,5 The student has a basic knowledge of various tools related to descriptive statistics and is able to characterize a community with their use at almost good level.
- › 4,0 The student has a basic knowledge of various tools related to descriptive statistics and is able to characterize a community with their use at good level.
- › 4,5 The student has a basic knowledge of various tools related to descriptive statistics and is able to characterize a community with their use at almost perfect level.
- › 5,0 The student has a basic knowledge of various tools related to descriptive statistics and is able to characterize a community with their use at perfect level.

EU 2 The student has a basic knowledge of various tools related to mathematical statistics and statistical inference and is able to use this knowledge to estimate and verify hypotheses of parameters of the general population.

- › 2,0 The student has not any basic knowledge of various tools related to mathematical statistics and statistical inference and is able to use this knowledge to estimate and verify hypotheses of parameters of the general population.
- › 3,0 The student has a basic knowledge of various tools related to mathematical statistics and statistical inference and is able to use this knowledge to estimate and verify hypotheses of parameters of the general population at minimum level.
- › 3,5 The student has a basic knowledge of various tools related to mathematical statistics and statistical inference and is able to use this knowledge to estimate

and verify hypotheses of parameters of the general population at almost good level.

- › 4,0 The student is able to analyse the changes of the phenomenon over time with the use of dynamics measures, trend functions and seasonal fluctuations at good level.
- › 4,0 The student has a basic knowledge of various tools related to mathematical statistics and statistical inference and is able to use this knowledge to estimate and verify hypotheses of parameters of the general population at almost perfect level.
- › 5,0 The student has a basic knowledge of various tools related to mathematical statistics and statistical inference and is able to use this knowledge to estimate and verify hypotheses of parameters of the general population at perfect level.

EU 3 The student is able to make a statistical analysis with the selection of appropriate tools for a given research problem.

- › 2,0 The student is not able to make a statistical analysis with the selection of appropriate tools for a given research problem.
- › 3,0 The student is able to make a statistical analysis with the selection of appropriate tools for a given research problem at minimum level.
- › 3,5 The student is able to make a statistical analysis with the selection of appropriate tools for a given research problem at almost good level.
- › 4,0 The student is able to make a statistical analysis with the selection of appropriate tools for a given research problem at good level.
- › 4,0 The student is able to make a statistical analysis with the selection of appropriate tools for a given research problem at almost perfect level.
- › 5,0 The student is able to make a statistical analysis with the selection of appropriate tools for a given research problem at perfect level.

Polish course name	STATYSTYKA INŻYNIERSKA
English course name	ENGINEERING STATISTICS
Course code	WIP-MDL-D1-ES-03
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	3
Number of ECTS points	3
Ways of assessment	Test

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15		15		

TEACHERS:

Dr inż. Edyta Kardas,

Dr inż. Rafał Wyczółkowski,

Dr inż. Sławomir Morel.

COURSE OBJECTIVES:

- › **C1** Provide students with knowledge in the field of conducting statistical research, allowing them to make decisions related to various engineering problems.
- › **C2** Acquainting students with statistical measures and methods of mass phenomena analysis.
- › **C3** Acquiring practical skills in using statistical methods to solve various analytical and research problems.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Basic knowledge of mathematics and economics.
2. Basic knowledge of the probability calculus.
3. Average mastery of the rules for processing data from research, eg social, technical - production or scientific.

4. Ability to work independently and in a group.
5. Ability to use an engineering calculator.
6. Ability to use literature and internet resources.

COURSE CONTENT

LECTURE

- › **L1** Characteristics of the statistical research process. Stages of statistical research.
- › **L2, L3, L4** Determining the values of measures of the distribution of a feature in a sample, including the measures of position, differentiation, asymmetry and concentration.
- › **L5, L6** Random variable and basic distributions of random variables.
- › **L7, L8** Exact and boundary distributions of sample statistics.
- › **L9, L10** Point and interval estimation. Determining the minimum number of measurements in relation to the postulate of representativeness of the statistical sample.
- › **L11, L12** Parametric tests in the verification of statistical hypotheses expressed by the arguments of classical data distributions or structure indexes.
- › **L13, L14** Nonparametric tests of statistical hypothesis verification.
- › **L15** The use of statistical methods in production management.

CLASSES

- › **C1** Acquainting students with the rules of passing the course. Designing a statistical survey. Collection of statistical data.
- › **C2.** Presentation of statistical data.
- › **C3** Determination of measures of the position of a sample data set.
- › **C4** Determination of dispersion measures for a sample data set.
- › **C5** Determining the asymmetry measures of the sample data set. Concentration and flattening of a sample set.
- › **C6** Data analysis with the use of known descriptive statistics - independent work.
- › **C7** Analysis of the basic distributions of random variables.
- › **C8** Use of exact and borderline distributions of sample statistics in tasks.

- › **C9** Estimation of parameters of the general population on the basis of a statistical sample. The minimum sample size for the assumed measurement accuracy.
- › **C10** Performing the test for the population mean value. Performing a significance test for two means.
- › **C11** Performing the test for the general population variance. Performing a test for two variances.
- › **C12** Carrying out the test for the population structure index. Carrying out a significance test for two structure indicators.
- › **C13, C14** Perform a hypothesis verification test for the distribution analysis.
- › **C15** The use of the knowledge of engineering statistics - test.

BASIC REFERENCES

1. M. Sobczyk: Statystyka, PWN Warszawa 2021 r.
2. S. Ostasiewicz, Z. Rusnak, U. Siedlecka: Statystyka. Elementy teorii i zadania, Wydawnictwo Akademii Ekonomicznej we Wrocławiu, Wrocław 1998 r.
3. E. Sojka: Statystyka w przykładach i zadaniach, Wydawnictwo Wyższej Szkoły Zarządzania i Nauk Społecznych w Tychach, Tychy 2003 r.
4. E. Nowak (red.): Metody statystyczne w działalności przedsiębiorstwa, Polskie Wydawnictwo Ekonomiczne, Warszawa 2001 r.
5. Suchecka J. (red.): Metody statystyczne. Zarys teorii i zadania, Wydawnictwo Wydziału Zarządzania Politechniki Częstochowskiej, Częstochowa 2002 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. M. Balcerowicz - Szkutnik, W. Szkutnik: Podstawy statystyki w przykładach i zadaniach. Cz. I.: Statystyka opisowa, Wydawnictwo Śląskiej Wyższej Szkoły Zarządzania im. Gen. Jerzego Ziętka w Katowicach, Katowice 2009 r.
2. M. Balcerowicz - Szkutnik, W. Szkutnik: Podstawy statystyki w przykładach i zadaniach. Cz. II.: Elementy rachunku prawdopodobieństwa i wnioskowania statystycznego, Wydawnictwo Śląskiej Wyższej Szkoły Zarządzania im. Gen. Jerzego Ziętka w Katowicach, Katowice 2009 r.

LEARNING OUTCOMES

- › **EU1** The student has a basic knowledge of various tools related to descriptive statistics and is able to characterize a community with their use.
- › **EU2** The student has a basic knowledge of various tools related to mathematical statistics and statistical inference and is able to use this knowledge to estimate and verify hypotheses of parameters of the general population.
- › **EU3** The student is able to make a statistical analysis with the selection of appropriate tools for a given research problem.

TEACHING TOOLS

- › Multimedia presentations.
- › Exercises - problem solving with the help of the teacher.
- › Laboratory equipment and guides.
- › Computer stations with software.

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

- › **F1.** Assessment of preparation for exercises.
- › **F2.** Assessment of the ability to apply the acquired knowledge during exercises.
- › **F3.** Assessment of activity during classes.
- › **P1.** Assessment of the mastery of the teaching material being the subject of exercises - final 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		
Exam		
Total contact hours	30	1,2

Student's own work		
Getting acquainted with the indicated literature	17	0,68
Preparation for seminar		
Preparation for classes	20	0,8
Preparation for lab		
Project preparation		
Consultation	4	0,16
Preparation for the test	4	0,16
Total student's own work	45	1,8
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_W01, K_W03, K_U04, K_U05, K_K02,	C1, C2, C3	L1 - L4, L15 C1 - C6, C15	F1 - F3, P1
EU 2	K_W01, K_W03, K_U04, K_U05,	C1, C2, C3	L5 - L15 C7 - C15	F1 - F3, P1

	K_K02,			
EU 3	K_W01, K_W03, K_U04, K_U05, K_K02,	C1, C2, C3	L1 - L15 C1 - C15	F1 - F3, P1

FORM OF ASSESSMENT - DETAILS

EU1 The student has a basic knowledge of various tools related to descriptive statistics and is able to characterize a community with their use.

- › 2,0 The student has not any basic knowledge of various tools related to descriptive statistics and is able to characterize a community with their use.
- › 3,0 The student has a basic knowledge of various tools related to descriptive statistics and is able to characterize a community with their use at minimum level.
- › 3,5 The student has a basic knowledge of various tools related to descriptive statistics and is able to characterize a community with their use at almost good level.
- › 4,0 The student has a basic knowledge of various tools related to descriptive statistics and is able to characterize a community with their use at good level.
- › 4,5 The student has a basic knowledge of various tools related to descriptive statistics and is able to characterize a community with their use at almost perfect level.
- › 5,0 The student has a basic knowledge of various tools related to descriptive statistics and is able to characterize a community with their use at perfect level.

EU2 The student is able to assess the strength of the relationship between various phenomena with the use of appropriate measures.

- › 2,0 The student is not able to assess the strength of the relationship between various phenomena with the use of appropriate measures.
- › 3,0 The student is able to assess the strength of the relationship between various phenomena with the use of appropriate measures at minimum level.
- › 3,5 The student is able to assess the strength of the relationship between various phenomena with the use of appropriate measures at almost good level.

- › 4,0 The student is able to assess the strength of the relationship between various phenomena with the use of appropriate measures at good level.
- › 4,5 The student is able to assess the strength of the relationship between various phenomena with the use of appropriate measures at almost perfect level.
- › 5,0 The student is able to assess the strength of the relationship between various phenomena with the use of appropriate measures at perfect level.

EU 3 The student is able to make a statistical analysis with the selection of appropriate tools for a given research problem.

- › 2,0 The student is not able to make a statistical analysis with the selection of appropriate tools for a given research problem.
- › 3,0 The student is able to make a statistical analysis with the selection of appropriate tools for a given research problem at minimum level.
- › 3,5 The student is able to make a statistical analysis with the selection of appropriate tools for a given research problem at almost good level.
- › 4,0 The student is able to make a statistical analysis with the selection of appropriate tools for a given research problem at good level.
- › 4,0 The student is able to make a statistical analysis with the selection of appropriate tools for a given research problem at almost perfect level.
- › 5,0 The student is able to make a statistical analysis with the selection of appropriate tools for a given research problem at perfect level.

Polish course name	PODSTAWY AUTOMATYZACJI I ROBOTYKI
English course name	BASICS OF AUTOMATION AND ROBOTICS
Course code	WIP-MDL-D1-BOAAR-03
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	3
Number of ECTS points	5
Ways of assessment	Test, project

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15		15	15	15

TEACHERS:

Dr inż. Tomasz Garstka.

COURSE OBJECTIVES:

- › **C1** Providing students with knowledge in the field of basics of automation and robotics and their importance in modern production systems.
- › **C2** Acquainting students with the functioning and properties of the elements, devices, and systems of automation and robotics.
- › **C3** Obtaining by the students the practical skills in the field of research and analysis, selection and operation of automation and robotics systems.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Knowledge of physics in the field of electricity, magnetism and mechanics
2. Knowledge of mathematics at the level of the basic course for the field of study, including integration and calculus of complex numbers.
3. Skills in the basics of computer science and information technology.
4. Ability to elaborate, analyze and synthesize research results for the purposes of the report on the course of the exercise and the description of the project in the form of an electronic document.

5. Knowledge of the English language.
6. Ability to use literature sources, catalogs and internet resources.

COURSE CONTENT

LECTURE

- › **L1** Automation and tasks of automation devices. Characteristics of basic concepts.
- › **L2, L3** Structure and classification of automatic control systems.
- › **L4 - L6** Elements and components of automation.
- › **L7, L8** Control of continuous processes. Controllers.
- › **L9, L10** Binary and digital control. Programmable controllers.
- › **L11, L12** Industrial robots - characteristics, construction and division.
- › **L13** Grippers and manipulators. Robotization of selected processes.
- › **L14** Kinematics and robot control. Programming robots.
- › **L15** Final test.

CLASSES

- › **C1** Overview of the subject of exercises and the teaching tools used.
- › **C2 - C8** Analysis of the operation of control systems and automatic regulation.
- › **C9 - C11** The use of IT tools in modelling and simulations of automation and robotics systems.
- › **C12 - C14** Problem analysis of issues related to the automation of robotization of selected processes.
- › **C15** Final test.

LABORATORY

- › **Lab1** Acquainting with the laboratory regulations and OHS regulations. Overview of the principles of performing exercises and reporting. Familiarization with the operation of measuring instruments and the laboratory stands and software used.
- › **Lab2 - Lab5** Testing of selected elements and components of automation as well as automatic control and regulation systems.
- › **Lab6 - Lab9** Programming of digital control systems and automatic control with a PLC controller.
- › **Lab10 - Lab13** Controlling manipulators and programming of robots.
- › **Lab14** Computer visualization and control of technological processes.

- › **Lab15** Final test.

PROJECT

P1 Overview and assigning teams to design tasks related to the automation or robotization of a selected operation or process.

P2, P3 Technical and functional analysis of design tasks.

P4 - P6 Selection of components and technical means necessary to automate or robotise a selected process.

P7 - P9 Development of control algorithms.

P10 - P14 Synthesis and evaluation of project tasks and their documentation.

P15 Final assessment of the projects.

BASIC REFERENCES

1. G. Kost, P. Łebkowski, Ł. Węsierski: Automatykacja i robotyzacja procesów produkcyjnych, Wyd. PWE, Warszawa 2018 r.
2. R. Więclawek, T. Mikulczyński, Z. Samsonowicz: Automatykacja procesów produkcyjnych, Wyd. PWN, WNT Warszawa 2021 r.
3. W. Kaczmarek, J. Panasiuk: Robotyzacja procesów produkcyjnych, Wyd. PWN, Warszawa 2018 r.
4. J. Kasprzyk.: Programowanie sterowników przemysłowych, Wyd. PWN, Warszawa 2020 r.
5. M. Szelerski: Automatyka przemysłowa w praktyce, Wyd. KaBe, Krosno 2016 r.
6. Z. Łukasik, A. Kuśmińska-Fijałkowska: Laboratorium automatyzacji i wizualizacji procesów, Wyd. UTH w Radomiu, Radom 2020 r.
7. T. Mikulczyński (red): Laboratorium podstaw automatyki i automatyzacji, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2005 r
8. R. Zdanowicz: Podstawy robotyki, Wyd. Politechniki Śląskiej, Gliwice 2010 r.
9. M. Szelerski: Robotyka przemysłowa, Wyd. KaBe, Krosno 2019 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. T. Mikulczyński (red.), Laboratorium podstaw automatyki i automatyzacji, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2005.
2. D. Schmid, A. Baumann, H. Kaufmann, H. Paetzold, B. Zippel: Mechatronika Wyd. REA, Warszawa 2002 r.

3. Czasopismo (bieżące numery od 2021 r.): Automatyka, Podzespoły, Aplikacje; Wyd. AVT.
4. T. Garstka, M. Knapiński, M. Kwapisz: Algorytm automatycznej nastawy szczeliny walcowniczej walcarki DUO-300. Mechanik, nr 01/2017.
5. T. Garstka, M. Knapiński, M. Kwapisz: Analiza struktury kinematycznej manipulatora załadowniczego pieca grzewczego. Materiały XVII International Scientific Conference New Technologies and Achievements in Metallurgy Material Engineering and Production Engineering, Czestochowa 2016, s. 255–259.

LEARNING OUTCOMES

- › **EU1** The student has theoretical knowledge in the field of basics of automation and robotics in typical production processes.
- › **EU2** The student is able to solve analytically and with the use of IT tools, engineering tasks related to the automation and robotization of typical production processes.
- › **EU3** The student is able to investigate, select, configure, program and design selected elements, devices and systems of automation and robotics.

TEACHING TOOLS

- › Multimedia presentations.
- › Laboratory teaching stations with automation and robotics components and devices.
- › Catalogs, documentation also in the form of online resources of automation and robotics elements and devices.
- › E-learning platform of the Częstochowa University of Technology, or other distance learning tools (optional possible use).

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

- › **F1.** Assessment of preparation for laboratory exercises/activity and creativity during laboratory classes.
- › **F2.** Assessment of reports from performed laboratories.

- › **F3.** Assessment of the preparation and work of the student during exercises and the implementation of tasks to be solved by himself.
- › **F4.** Assessment of the preparation and work of the student during design classes and the implementation of the stages of the project task.
- › **P1** Final test, assessment of the mastery of the teaching material being the subject of laboratory exercises.
- › **P2.** Final test, assessment of the mastery of the teaching material being the subject of the lecture.
- › **P3.** Final test, assessment of the mastery of the teaching material being the subject of the exercises.
- › **P4.** Final assessment of the project task.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures	15	0,6
Seminar		
Classes	15	0,6
Laboratory	15	0,6
Project	15	0,6
Test		
Exam		
Total contact hours	60	2,4
Student's own work		
Getting acquainted with the indicated literature	12	0,48
Preparation for seminar		
Preparation for classes	12	0,48
Preparation for lab	12	0,48
Project preparation	15	0,6
Consultation	4	0,16
Preparation for the test	10	0,4
Total student's own work	65	2,6

Total number of hours/ ECTS points for the course	125	5,0
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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_W05, K_U09,	C1	L1 - L15	P2
EU 2	K_W03, K_W05, K_U03, K_U05, K_U06,	C2, C3	C1 - C15 P1 - P15	F3, P3 F4, P4
EU 3	K_W03, K_W05, K_U03, K_U04, K_U05, K_U06, K_U08, K_U09, K_K02,	C2, C3	Lab1 - Lab15 P1 - P15	F1, F2, P1 F4, P4

FORM OF ASSESSMENT - DETAILS

EU1 The student has theoretical knowledge in the field of basics of automation and robotics in typical production processes.

- › 2,0 The student doesn't have basic theoretical knowledge in the field of basics of automation and robotics in typical production processes.
- › 3,0 The student has partially theoretical knowledge in the field of basics of automation and robotics in typical production processes at a minimum level.
- › 3,5 The student has theoretical knowledge in the field of basics of automation and robotics in typical production processes at an almost good level.
- › 4,0 The student has theoretical knowledge in the field of basics of automation and robotics in typical production processes at a good level.
- › 4,5 The student has theoretical knowledge in the field of basics of automation and robotics in typical production processes at an almost very good level.
- › 5,0 The student has extended theoretical knowledge in the field of basics of automation and robotics in typical production processes at a very good level.

EU2 The student is able to solve analytically and with the use of IT tools, engineering tasks related to the automation and robotization of typical production processes.

- › 2,0 The student is not able to solve analytically and with the use of IT tools, engineering tasks related to the automation and robotization of typical production processes.
- › 3,0 The student is able to solve analytically and with the use of IT tools, simple engineering tasks related to the automation and robotization of typical production processes at a minimum level.
- › 3,5 The student is able to solve analytically and with the use of IT tools, engineering tasks related to the automation and robotization of typical production processes at an almost good level.
- › 4,0 The student is able to solve analytically and with the use of IT tools, engineering tasks related to the automation and robotization of typical production processes at a good level.
- › 4,5 The student is able to solve analytically and with the use of IT tools, engineering tasks related to the automation and robotization of typical production processes at an almost very good level.

- › 5,0 The student is able to solve analytically and with the use of IT tools, advanced engineering tasks related to the automation and robotization of typical production processes at a very good level.

EU 3 The student is able to investigate, select, configure, program and design selected elements, devices and systems of automation and robotics.

- › 2,0 The student is not able to investigate, select, configure, program and design selected elements, devices and systems of automation and robotics.
- › 3,0 The student is able to investigate, select, configure, program and design selected elements, devices and systems of automation and robotics at a minimum level.
- › 3,5 The student is able to investigate, select, configure, program and design selected elements, devices and systems of automation and robotics at an almost good level.
- › 4,0 The student is able to investigate, select, configure, program and design selected elements, devices and systems of automation and robotics at a good level.
- › 4,5 The student is able to investigate, select, configure, program and design selected elements, devices and systems of automation and robotics at an almost very good level.
- › 5,0 The student is able to investigate, select, configure, program and design selected elements, devices and systems of automation and robotics at very good level.

Polish course name	NOWOCZESNE MAGAZYNY
English course name	MODERN WAREHOUSES
Course code	WIP-MDL-D1-MW-03
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	3
Number of ECTS points	5
Ways of assessment	Test, project

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15		15	15	15

TEACHERS:

Dr inż. Tomasz Garstka,

Dr inż. Ewa Staniewska.

COURSE OBJECTIVES:

- › **C1** Providing students with knowledge in the field of warehousing processes and the functioning of modern warehouses.
- › **C2** Obtaining by the students the practical skills in the field of solving engineering, economic and organizational problems related to the warehousing process.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Basic knowledge of logistic processes
2. Basic knowledge of mathematics, physics and mechanics
3. Ability to work independently and in a group.
4. Ability to use literature references and internet resources.

COURSE CONTENT

LECTURE

- › **L1, L2** Warehouse and warehousing - characteristics of basic concepts and normative acts.
- › **L3, L4** Characteristics of selected storage processes.
- › **L5, L6** Construction and arrangement of warehouses.
- › **L7 - L9** Technical equipment of warehouses.
- › **L10** Organization and safety of work in warehouses.
- › **L11, L12** IT tools used for warehouse management.
- › **L13, L14** Automation and robotization of warehouse operations.
- › **L15** Final test.

CLASSES

- › **C1** Discussion of the subject of calculating exercises and the tools used.
- › **C2 - C7** Problem and technical analysis of storage-related processes.
- › **C8 - C14** Analysis of storage efficiency and costs.
- › **C15** Final test.

LABORATORY

- › **Lab1** Getting acquainted with laboratory regulations and health and safety regulations. Overview of the principles of performing exercises and reporting. Familiarization with the operation of measuring instruments and software.
- › **Lab2 - Lab8** Examination of selected elements, devices and systems of technical and IT equipment in modern warehouses.
- › **Lab9 - Lab14** Modelling and simulation of selected processes related to storage.
- › **Lab15** Final test.

PROJECT

- › **P1** Overview and allocation to teams of project tasks related to the storage of selected goods.
- › **P2, P3** Functional and technical analysis of design tasks.
- › **P4, P5** Selection of the storage process.
- › **P6 - P8** Selection of warehouse layout.
- › **P9 - P11** Selection of warehouse technical equipment components.
- › **P12 - P14** Synthesis and evaluation of project tasks and their documentation.

- › **P15** Final evaluation of projects.

BASIC REFERENCES

1. K. Grzybowska: Gospodarka zapasami i magazynem. Część 2. Zarządzanie magazynem, Wyd. Difin, Warszawa 2010 r.
2. B. Galińska: Gospodarka magazynowa, Wyd. Difin, Warszawa 2016 r.
3. Praca zbiorowa: Zarządzanie gospodarką magazynową, Wyd. PWE, Warszawa 1997 r.
4. Z Dudziński: Vademecum organizacji gospodarki magazynowej, Ośrodek Doradztwa i Doskonalenia Kadr, Gdańsk 2008 r.
5. E. Januła, M. Kasińska, P. Kwiatkiewicz: Zapasy i magazynowanie, Wyd. As Pik, Poznań 2022 r.
6. Portal internetowy: nm.pl

SUPPLEMENTARY REFERENCE MATERIALS

1. S. Krzyżniak: Podstawy zarządzania zapasami w przykładach, Wyd. Instytut Logistyki i Magazynowania, Poznań 2002 r.
2. M. Jacyna, K. Lewczuk: Projektowanie systemów logistycznych, Wyd. PWN, Warszawa 2016 r.
3. W. Kaczmarek, J. Panasiuk: Robotyzacja procesów produkcyjnych, Wyd. PWN, Warszawa 2018 r.
4. G. Kost, P. Łebkowski, Ł. Węsierski: Automatyzacja i robotyzacja procesów produkcyjnych, Wyd. PWE, Warszawa 2018 r.
5. Czasopismo branżowe: Nowoczesny Magazyn.

LEARNING OUTCOMES

- › **EU1** The student has theoretical knowledge in the field of organization and operation of modern warehouses.
- › **EU2** The student can solve analytically and with the use of IT tools, engineering, economic and organizational problems related to warehousing.
- › **EU3** The student is able to test, select, configure, and program elements, devices, and systems of technical equipment in modern warehouses, as well as conduct their research and analysis of the functioning.

TEACHING TOOLS

- › Multimedia presentations.
- › Manuals, scripts and task sets.
- › Laboratory equipment and instructions.
- › Computer stations with software.
- › E-learning platform of the Częstochowa University of Technology, or other distance learning tools (possible use).

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

- › **F1.** Assessment of preparation and work on the exercises.
- › **F2.** Assessment of preparation for laboratory exercises/activity and creativity during laboratory classes.
- › **F3.** Assessment of reports from performed laboratories.
- › **F4.** Assessment of the preparation and work of the student during design classes and the implementation of the stages of the project task.
- › **P1.** Assessment of the mastery of the teaching material within the lectures - final test.
- › **P2.** Assessment of the mastery of the teaching material within the exercises - final test.
- › **P3.** Final test, assessment of the mastery of the teaching material being the subject of laboratory exercises.
- › **P4.** Final assessment of the design task.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures	15	0,6
Seminar		
Classes	15	0,6
Laboratory	15	0,6
Project	15	0,6
Test		
Exam		

Total contact hours	60	2,4
Student's own work		
Getting acquainted with the indicated literature	12	0,48
Preparation for seminar		
Preparation for classes	12	0,48
Preparation for lab	12	0,48
Project preparation	14	0,6
Consultation	4	0,16
Preparation for the test	10	0,4
Total student's own work	65	2,6
Total number of hours/ ECTS points for the course	125	5,0

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_W05, K_W02, K_U09,	C1	L1 - L15	P1
EU 2	K_W03, K_U04, K_U05, K_U09,	C2	C1 - C15 P1 - P15	F1, P2 F4, P4
EU 3	K_W03,	C2	W7 - W9	F2, F3, P3

	K_W05, K_U04, K_U05, K_U09, K_K02,		W12 - W15 Lab1 - Lab15 P1 - P15	F4, P4
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FORM OF ASSESSMENT - DETAILS

EU1 The student has theoretical knowledge in the field of organization and operation of modern warehouses.

- › 2,0 The student doesn't have theoretical knowledge in the field of organization and operation of modern warehouses.
- › 3,0 The student has theoretical knowledge in the field of organization and operation of modern warehouses at minimum level.
- › 3,5 The student has theoretical knowledge in the field of organization and operation of modern warehouses at almost good level.
- › 4,0 The student has theoretical knowledge in the field of organization and operation of modern warehouses at good level.
- › 4,5 The student has theoretical knowledge in the field of organization and operation of modern warehouses at almost perfect level.
- › 5,0 The student has theoretical knowledge in the field of organization and operation of modern warehouses at perfect level.

EU2 The student can solve analytically and with the use of IT tools, engineering, economic and organizational problems related to warehousing.

- › 2,0 The student can't solve analytically and with the use of IT tools, engineering, economic and organizational problems related to warehousing.
- › 3,0 The student can solve analytically and with the use of IT tools, engineering, economic and organizational problems related to warehousing at minimum level.
- › 3,5 The student can solve analytically and with the use of IT tools, engineering, economic and organizational problems related to warehousing at almost good level.
- › 4,0 The student can solve analytically and with the use of IT tools, engineering, economic and organizational problems related to warehousing at good level.

- › 4,5 The student can solve analytically and with the use of IT tools, engineering, economic and organizational problems related to warehousing at almost perfect level.
- › 5,0 The student can solve analytically and with the use of IT tools, engineering, economic and organizational problems related to warehousing at almost perfect level.

EU 3 The student is able to test, select, configure, and program elements, devices, and systems of technical equipment in modern warehouses, as well as conduct their research and analysis of the functioning.

- › 2,0 The student is not able to test, select, configure, and program elements, devices, and systems of technical equipment in modern warehouses, as well as conduct their research and analysis of the functioning.
- › 3,0 The student is able to test, select, configure, and program elements, devices, and systems of technical equipment in modern warehouses, as well as conduct their research and analysis of the functioning at minimum level.
- › 3,5 The student is able to test, select, configure, and program elements, devices, and systems of technical equipment in modern warehouses, as well as conduct their research and analysis of the functioning at almost good level.
- › 4,0 The student is able to test, select, configure, and program elements, devices, and systems of technical equipment in modern warehouses, as well as conduct their research and analysis of the functioning at good level.
- › 4,5 The student is able to test, select, configure, and program elements, devices, and systems of technical equipment in modern warehouses, as well as conduct their research and analysis of the functioning at almost perfect level.
- › 5,0 The student is able to test, select, configure, and program elements, devices, and systems of technical equipment in modern warehouses, as well as conduct their research and analysis of the functioning at perfect level.

Polish course name	PROJEKTOWANIE PROCESOWE MATERIAŁÓW
English course name	PROCESS DESIGN OF MATERIALS
Course code	WIP-MDL-D1-PDOM-04
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	4
Number of ECTS points	4
Ways of assessment	Exam

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15				30

TEACHERS:

Dr inż. Artur Hutny,

Dr hab. inż. Marek Warzecha, prof. PCz.,

Dr hab. inż. Adam Cwudziński, prof. PCz.,

Dr Bernadeta Gajda.

COURSE OBJECTIVES:

- › **C1** Teaching the principle of a methodical approach to issues related to the design of technology and process installations.
- › **C2** Teaching students the basic elements of industrial design.

**PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER
COMPETENCES:**

1. Basic knowledge of the technology of production processes.
2. Knowledge of the basics of the theory of process engineering.
3. Knowledge of selected issues of mechanical and chemical processes.
4. Ability to work independently and in a group.
5. Ability to use literature sources and internet resources.

COURSE CONTENT

LECTURE

- › **L1, L2** Basic concepts and definitions related to process design.
- › **L3, L4** Measures of economic efficiency of production, profitability of the enterprise.
- › **L5, L6** Characteristics of the components of the process design.
- › **L7, L8** Schematic diagram of the process with material and energy balance.
- › **L9, L10** A diagram of the course of technology along with the determination of the amount of emissions.
- › **L11, L12** Stages of constructional preparation of production.
- › **L13** Technology optimization.
- › **L14, L15** Preparation of design and technological documentation.

PROJECT

- › **P1** Familiarizing students with the rules of passing the course, assigning individual topics for project tasks.
- › **P2 - P8** Preparation of an industrial technology project of a selected method in iron metallurgy.
- › **P9 - P14** Preparation of an industrial technology project of the selected method in aluminium metallurgy.
- › **P15 - P18** Development of a process diagram along with a material and energy balance.
- › **P19 - P24** Design of industrial recycling technology.
- › **P25 - P30** Design of industrial metal recovery technology.

BASIC REFERENCES

1. Praca zbiorowa pod red. L. Synoradzki i J. Wisiański: Projektowanie procesów technologicznych. Od laboratorium do instalacji przemysłowej, Wyd. OWPW, Warszawa 2019 r.
2. M. Ulewicz, J. Siwka: Procesy odzysku i recyklingu wybranych materiałów, Wyd. WIPMiFS Politechniki Częstochowskiej, Częstochowa, 2010 r.
3. Grajewski P.: Organizacja procesowa, projektowanie i konfiguracja, Wyd. PWE, Warszawa 2007 r.

4. Mróz J., Recykling i utylizacja materiałów odpadowych w agregatach metalurgicznych, Wyd. Politechniki Częstochowskiej, Częstochowa 2006 r.
5. Jowsa J. Inżynieria procesów kadziowych w metalurgii stali, Wyd. Pol. Częstochowska, Częstochowa, 2008 r.

SUPPLEMENTARY REFERENCE MATERIALS

Domestic and foreign trade magazines.

LEARNING OUTCOMES

- › **EU1** The student has knowledge of the methodical solution of the design task related to the technological process.
- › **EU2** The student has knowledge of the components of the design of modern technologies and process installations.

TEACHING TOOLS

- › Lecture with the use of audiovisual aids.
- › Use of technical literature, textbooks, scripts, technical journals and conference materials, including English - language in the field of the subject.
- › E-learning platform of the Częstochowa University of Technology or other distance learning tools.

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

- › **F1.** Assessment of preparation for design classes.
- › **F2.** Assessment of studies assigned individually to students of project tasks included in the curriculum of the subject.
- › **P1.** Assessment of the mastery of the teaching material being the subject of the lectures - exam.
- › **P2.** Assessment of the mastery of the teaching material being the subject of the project task.

STUDENT WORKLOAD

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

Seminar		0
Classes		0
Laboratory		0
Project	30	1,2
Test		
Exam	4	0,16
Total contact hours	49	1,96
Student's own work		
Getting acquainted with the indicated literature	10	0,4
Preparation for seminar		0
Preparation for classes		0
Preparation for lab		0
Project preparation	30	1,2
Consultation	4	0,16
Preparation for the exam	7	0,28
Total student's own work	51	2,04
Total number of hours/ ECTS points for the course	100	4,0

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_W02,	C1, C2	L1 - L15,	F1, F2, P1, P2

	K_U04,		P1 - P30	
EU 2	K_W02, K_U04,	C1, C2	L1 - L15, P1 - P30	F1, F2, P1, P2

FORM OF ASSESSMENT - DETAILS

EU1 The student has knowledge of the methodical solution of the design task related to the technological process.

- › 2,0 The student has no knowledge about the methodical solution of a design task related to the technological process.
- › 3,0 The student has sufficient knowledge about the methodical solution of a design task related to the technological process.
- › 3,5 The student has a fairly good knowledge of the methodical solution of a design task related to the technological process.
- › 4,0 The student has a good knowledge of the methodical solution of a design task relating to the technological process to a good degree.
- › 4.5 The student has an almost very good knowledge of the methodical solution of a design task related to the technological process.
- › 5,0 The student has a very good knowledge of the methodical solution of the design task concerning the technological process.

EU2 The student has knowledge of the components of the design of modern technologies and process installations.

- › 2.0 The student has no knowledge of the design components of modern technologies and process installations.
- › 3,0 The student has a sufficient knowledge of the design components of modern technologies and process installations.
- › 3,5 The student has a fairly good knowledge of the design components of modern technology and process installations.
- › 4,0 The student has a good knowledge of the design components of modern technologies and process installations.
- › 4,5 The student has an almost very good knowledge of the design components of modern technologies and process installations.
- › 5,0 The student has a very good knowledge of the design components of modern technologies and process installations.

Polish course name	MARKETING I BADANIA MARKETINGOWE
English course name	MARKETING AND MARKETING RESEARCH
Course code	WIP-MDL-D1-MAMR-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	Test

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15		15		

TEACHERS:

Dr inż. Zbigniew Skuza,

Dr inż. Cezary Kolmasiak,

Dr inż. Teresa Bajor.

COURSE OBJECTIVES:

- › **C1** Providing students with knowledge in the field of marketing.
- › **C2** To acquaint students with the methods of researching the needs and expectations of buyers.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Basic knowledge of entrepreneurship and business management.
2. Ability to work independently and in a group.
3. Ability to use literature sources and internet resources.

COURSE CONTENT

LECTURE

- › **L1, L2** The essence of marketing.
- › **L3, L4** Product.

- › **L5, L6** Price.
- › **L7, L8** Distribution.
- › **L9, L10** Special offer.
- › **L11** Market segmentation.
- › **L12** Consumers and their behaviour on the market.
- › **L13** Marketing information system.
- › **L14** Marketing plan.
- › **L15** Summary of the lectures.

CLASSES

- › **C1** Presentation of the principles of obtaining a credit from the exercises.
Discussion of the scope of the subject matter of the classes.
- › **C2, C3** The essence of marketing.
- › **C4, C5** Marketing research.
- › **C6** Industrial Marketing.
- › **C7** Marketing of services.
- › **C8** E - Marketing.
- › **C9** Marketing in international exchange.
- › **C10, C11** Price strategy.
- › **C12** Distribution of goods.
- › **C13** Promotion as a marketing tool.
- › **C14** Information systems in marketing.
- › **C15** Summary of exercises - test.

BASIC REFERENCES

1. P. Kotler: Marketing, Dom Wydawniczy REBIS, Poznań 2005 r.
2. G. Armstrong, P. Kotler: Marketing: wprowadzenie, Wolters Kluwer Polska Sp. z o. o., Warszawa 2012 r.
3. A. I. Baruk, A. Dzdowski, K. Hys: Marketing dla inżynierów, Polskie Wydawnictwo Ekonomiczne, Warszawa 2021 r.
4. J. Westwood: Droga do Sukcesu - Jak stworzyć plan marketingowy, Lingea Sp z o. o., Kraków 2021 r.
5. M.B. Wood: Plan marketingowy, Polskie Wydawnictwo Ekonomiczne, Warszawa 2007 r.

6. K. Mazurek – Łopacińska: Badania marketingowe: teoria i praktyka, Wydawnictwo Naukowe PWN, Warszawa 2005 r.
7. B. Pilarczyk, H. Mruk: Kompendium wiedzy o marketingu, Wydawnictwo Naukowe PWN, Warszawa, 2013 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. Z. Skuza. C. Kolmasiak: Działania promocyjne w szkolnictwie wyższym – analiza przypadku, Monografie nr 69, Wydawnictwo Wydziału Inżynierii Produkcji i Technologii Materiałów Politechniki Częstochowskiej, Częstochowa 2017 r., str. 153 – 167.
2. M. Ogórek, T. Bajor: Wybrane zagadnienia dotyczące usprawnienia procesów w przedsiębiorstwie, Redakcja monografii nr 58, Wydawnictwo Wydziału Inżynierii Produkcji i Technologii Materiałów Politechniki Częstochowskiej, Częstochowa, 2016 r., (ISBN: 978-83-63989-41-5).

LEARNING OUTCOMES

- › **EU1** The student has basic knowledge in the field of marketing.
- › **EU2** The student has knowledge of marketing research methods.

TEACHING TOOLS

- › Multimedia presentations.
- › Classes - solving problem tasks with the help of the teacher.
- › CUT e-learning platform.

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

- › **F1.** Assessment of activity during classes.
- › **F2.** Assessment of self-preparation for exercises.
- › **P1.** Final 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	2	0,08
Exam		
Total contact hours	32	1,28
Student's own work		
Getting acquainted with the indicated literature	5	0,2
Preparation for seminar		
Preparation for classes	5	0,2
Preparation for lab		
Project preparation		
Consultation	3	0,12
Preparation for the test	5	0,2
Total student's own work	18	0,72
Total number of hours/ ECTS points for the course	50	2,0

ADDITIONAL INFORMATION

Timetable of classes	https://usosweb.pcz.pl/
Information about the consultation (time + place)	https://usosweb.pcz.pl/

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_W07,	C1	L1 - L15	F1
EU 2	K_U04,	C2	C1 - C15	F2 P1

FORM OF ASSESSMENT - DETAILS

EU1 The student has basic knowledge in the field of marketing.

- › 2,0 The student has no basic knowledge of marketing.
- › 3,0 The student has some basic knowledge of marketing.
- › 3,5 The student has almost basic knowledge in the field of marketing.
- › 4,0 The student has a good basic knowledge of marketing.
- › 4,5 The student has an almost very good basic knowledge of marketing.
- › 5,0 The student has a very good basic knowledge of marketing.

EU2 The student has knowledge of marketing research methods.

- › 2,0 The student has no basic knowledge of marketing research methods.
- › 3,0 The student partially has a basic knowledge of marketing research methods.
- › 3,5 The student has almost a basic knowledge of marketing research methods.
- › 4,0 The student has a good basic knowledge of marketing research methods.
- › 4,5 The student has an almost very good knowledge of the methods of marketing research.
- › 5,0 The student has a very good basic knowledge of marketing research methods.

Polish course name	OPAKOWANIA I SYSTEMY IDENTYFIKACJI PRODUKTÓW
English course name	PACKAGING AND PRODUCT IDENTIFICATION SYSTEMS
Course code	WIP-MDL-D1-PAPIS-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	Reports/Test

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15			15	

TEACHERS:

Dr inż. Dariusz Krzywda.

COURSE OBJECTIVES:

- › **C1** Presentation and discussion of theoretical issues concerning packaging, the scope and scale of packaging use, basic criteria for its division and function.
- › **C2** Characteristics and overview of product and packaging identification systems in use.

**PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER
COMPETENCES:**

1. The student has basic knowledge of economics.
2. The student has basic knowledge of logistics.
3. the student is able to work in a team.
4. the student has basic knowledge of physics and chemistry from the scope of secondary education.

COURSE CONTENT

LECTURE

- › **L1** Introduction to the subject of packaging.
- › **L2** The packaging process as part of the logistics system.
- › **L3** Areas of application of packaging.
- › **L4** Definitions and classification of packaging.
- › **L5** Functions of packaging.
- › **L6** Requirements placed on packaging in logistic processes.
- › **L7** Obligations of the packaging producer introducing packaging into the economic cycle.
- › **L8** Marking of packaging, products.
- › **L9** Packaging in logistic chains.
- › **L10** Packaging in the economic cycle.
- › **L11** Materials used for packaging manufacture.
- › **L12** Packaging design guidelines.
- › **L13** Packaging waste.
- › **L14** Characteristics of packaging waste.
- › **L15** Packaging waste management systems.

Laboratory

- › **Lab1** Introductory class, health and safety training, familiarisation with the regulations of the Packaging Laboratory.
- › **Lab 2, 3, 4** Identification and evaluation of packaging properties used for product protection.
- › **Lab 5, 6** Identification and evaluation of the properties of packaging auxiliaries used to protect products.
- › **Lab 7, 8** Analysis and evaluation of selected product packaging techniques.
- › **Lab 9, 10** Ways of labelling packaging and products.
- › **Lab 11** Design of packaging and labelling.
- › **Lab 12** The packaging process.
- › **Lab 13** Packaging from a logistics perspective. Packaging cycle in the supply chain.
- › **Lab 14** Pallet load units - types, physical, mechanical and functional properties.
- › **Lab 15** Circulation of loading units. Dimensional interdependence of pallets, means of transport and storage space.

BASIC REFERENCES

1. Cierpiszewski R., Opakowania aktywne i inteligentne, Wydaw. Uniwersytetu Ekonomicznego, Poznań 2016 r.
2. Dudziński Z., Opakowania w gospodarce magazynowej: z dokumentacją i wzorcową instrukcją gospodarowania opakowaniami: stan prawny na dzień 1 stycznia 2014 r., ODDK [Ośrodek Doradztwa i Doskonalenia Kadr], Gdańsk 2014 r.
3. Korzeniowski A., Skrzypek M., Szyszka G. Opakowania w systemach logistycznych, Biblioteka Logistyka, Poznań 2010 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. Klonowska-Matynia M., Opakowania produktów na rynku mleczarskim: studium empiryczne, Wydaw. Politechniki Koszalińskiej, Koszalin 2011 r.
2. Krzywda D., Krzywda J. Logistyka zwrotna a zrównoważony rozwój. System kaucyjny opakowań w Niemczech. Cz.1, Logistyka nr 3, 2014 r.
3. Krzywda D., Krzywda J. Logistyka zwrotna a zrównoważony rozwój. System kaucyjny opakowań w Niemczech. Cz.2, Logistyka nr 3, 2014 r.
4. Kisperska-Moroń D. (red.) Logistyka. Biblioteka Logistyka, Poznań 2009 r.
5. Krzywda D. Packaging - from Neolithic to Packaging Industry, Zeszyty Naukowe Politechniki Częstochowskiej. Zarządzanie, Częstochowa, 2017 r.

LEARNING OUTCOMES

- › **EU1** The student defines packaging and characterises factors influencing its use.
- › **EU2** The student divides packaging and describes its functions.
- › **EU3** The student analyses the determinants influencing the choice of packaging identification system, product and forms load unit.

TEACHING TOOLS

- › Lecture using audiovisual means.
- › Laboratory equipment.

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

- › F1. Reports from laboratory exercises.
- › F2. Observation of the student work during laboratory classes.
- › P1. Evaluation of mastering the material taught in the lectures - test.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures	15	0,6
Seminar		
Classes		
Laboratory	15	0,6
Project		
Test		
Exam		
Total contact hours	30	1,20
Student's own work		
Getting acquainted with the indicated literature	5	0,2
Preparation for seminar		
Preparation for classes		
Preparation for lab	5	0,2
Project preparation		
Consultation	2	0,08
Preparation for the test	8	0,32
Total student's own work	20	0,8
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_W02, K_W03, K_W06, K_U02, K_U04, K_U07, K_K01, K_K02,	C1	L1 - L8 Lab1 - Lab12	F1, F2, P1
EU 2	K_W02, K_W03, K_W06, K_U02, K_U04, K_U07, K_K01, K_K02,	C1	L5 - L8 Lab4 - Lab12	F1, F2, P1
EU 3	K_W02, K_W03, K_W07, K_U02, K_U04, K_U07, K_K01, K_K04,	C1, C2	L8 - L15 Lab1 - Lab15	F1, F2, P1

FORM OF ASSESSMENT - DETAILS

EU1 The student defines packaging and characterises factors influencing its use.

- › 2,0 Student cannot define packaging and does not specify the scope of application of packaging.
- › 3,0 Student partially defines the term packaging and generally lists factors that affect the range of packaging used.
- › 3,5 The student defines the term packaging in general and generally lists the factors influencing the range of packaging used.
- › 4,0 The student defines packaging correctly and describes correctly factors influencing the range of packaging used.
- › 4,5 The student defines packaging almost very well and describes in detail almost very well factors influencing the range of packaging used.
- › 5,0 Student defines individual packages very well and describes very well in detail the factors influencing the range of packaging used.

EU2 The student divides packaging and describes its functions.

- › 2,0 The student does not make a classification of packaging and does not know its functions.
- › 3,0 Student is able to make a general classification of packaging and identifies basic functions of packaging.
- › 3,5 The student is almost able to list and generally present the classification of packaging and lists some of its functions.
- › 4,0 The student is able to list and generally present the classification of packaging and lists some of its functions.
- › 4,5 The student is almost able to make a precise classification of packaging and knows almost very well all its functions.
- › 5,0 The student is able to make an accurate classification of packaging and knows all its functions very well.

EU3 The student analyses the determinants influencing the choice of packaging identification system, product and forms load unit.

- › 2,0 The student does not make a classification of packaging and does not know its functions.
- › 3,0 Student lists determinants influencing the choice of packaging identification system and forms the unit of load.
- › 3,5 Student is almost able to list determinants influencing the choice of packaging identification system and not characterises not all of them and forms a loading unit.
- › 4,0 Student is able to list determinants influencing the choice of packaging identification system and characterises not all of them and forms a loading unit.
- › 4,5 The student is able to list and correctly describe all determinants influencing the choice of packaging identification system and forms the loading unit almost very well.
- › 5,0 The student is able to list and correctly describe all determinants related to the choice of packaging identification system and forms the unit of load very well.

Polish course name	MATERIAŁY POLIMEROWE
English course name	POLYMER MATERIALS
Course code	WIP-MDL-D1-PM-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
30			15	

TEACHERS:

Dr inż. Renata Caban.

COURSE OBJECTIVES:

- › **C1** To provide students with a basic knowledge of polymeric materials, their nomenclature and properties.
- › **C2** To familiarise students with the methods and techniques of manufacturing polymeric materials.
- › **C3** To familiarise students with polymer materials testing methods and the fundamentals of polymer materials processing and recycling.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

The student is familiar with the basics in physics, mathematics and general chemistry, is able to use mathematical operations to solve given tasks, is able to use various sources of information including instructions and technical documentation, is able to work independently and in a group, is able to interpret and present the results of own actions correctly.

COURSE CONTENT

LECTURE

- › **L1** Outline of the development of polymeric materials and basic concepts: molecular weight and degree of polymerisation.
- › **L2, 3** Polymer production, raw materials, types of polymerisation and modification, technical polymerisation methods.
- › **L4, 5** Basics of polymer classification and nomenclature.
- › **L6** Additional components of polymeric materials and their characterisation.
- › **L7** Polymer physicochemistry and crystallisation.
- › **L 8, 9, 10** Characteristics of the more important polymers.
- › **L11** Properties of polymeric materials.
- › **L12, L13** Polymer composites.
- › **L14, 15** Fundamentals of polymer materials processing and recycling.

LABORATORY

- › **Lab1, 2** Identification of polymeric materials.
- › **Lab3, 4** Determination of the degree of polymerisation - analytical tasks.
- › **Lab5, 6** Investigations of basic physical properties.
- › **Lab7, 8** Using CES software to find information on different polymers and their processing.
- › **Lab9, 10** Resins. Manufacture of a polymer matrix composite.
- › **Lab11, 12** Investigations into the mechanical properties and structure of polymeric materials.
- › **Lab13** Depolymerisation of methyl methacrylate.
- › **Lab14,15** Printing of polymer products.

BASIC REFERENCES

1. J. Koszkuł: Materiały polimerowe. Politechnika Częstochowska, 1999 r.
2. M. Ashby, H. Shercliff, D.Cebon: Inżynieria materiałowa, tom 1, 2.Wydawnictwo Galaktyka, Łódź 2011 r.
3. J. Koszkuł, R. Caban, J. Nabiątek: Narzędzia do przetwórstwa polimerów. Politechnika Częstochowska 2010 r.

4. J. F. Rabek: Współczesna wiedza o polimerach. Budowa strukturalna polimerów i metody badawcze. Tom 1, Wydawnictwo Naukowe PWN, 2019 r.

LEARNING OUTCOMES

- › **EU1** has theoretical knowledge of polymer production methods and techniques, and is familiar with polymer testing methods and processing techniques.
- › **EU2** is able to prepare a report on the implementation of the exercise.

TEACHING TOOLS

- › Multimedia presentations.
- › Laboratory equipment and guides.
- › CUT e-learning platform (possible use).
- › Computer stations with software.

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

- › **F1.** Assessment of curriculum tasks.
- › **F2.** Assessment of the mastery of the learning material subject to laboratory tasks - pass/fail colloquium.
- P1.** Assessment of mastery of the lecture material - pass/fail colloquium.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures	30	1,2
Seminar		
Classes		
Laboratory	15	0,6
Project		
Test		
Exam		
Total contact hours	45	1,8
Student's own work		
Getting acquainted with the indicated literature	12	0,48
Preparation for seminar		

Preparation for classes		
Preparation for lab	10	0,4
Project preparation		
Consultation	2	0,08
Preparation for the test	6	0,24
Total student's own work	30	1,2
Total number of hours/ ECTS points for the course	75	3,0

ADDITIONAL INFORMATION

Information about the consultation (time + place)	https://wip.pcz.pl/dla-studentow/konsultacje-dla-studentow
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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_W03, K_W04, K_U03, K_U08, K_U09, K_K02,	C1 - C3	L1 - L15	P1
EU 2	K_W03, K_W05, K_U03, K_U09, K_K03,	C1 - C3	Lab1 - Lab15	F1, F2

FORM OF ASSESSMENT - DETAILS

EU1 has theoretical knowledge of polymer production methods and techniques, and is familiar with polymer testing methods and processing techniques.

- › 2,0 The student does not have basic theoretical knowledge of polymer production methods and techniques, does not know polymer testing methods and polymer processing techniques.

- › 3,0 The student is partially familiar with basic methods and techniques of polymer production and polymer testing methods as well as polymer processing techniques.
- › 3,5 The student is almost familiar with the basic methods and techniques of polymer production and polymer testing methods as well as polymer processing techniques.
- › 4,0 The student is well acquainted with the basic methods and techniques of polymer production and polymer testing methods as well as polymer processing techniques.
- › 4,5 The student has a very good understanding of the basic methods and techniques of polymer production and polymer testing methods as well as polymer processing techniques.
- › 5,0 The student is very well acquainted with basic methods and techniques of polymer production and polymer testing methods as well as polymer processing techniques.

EU2 is able to prepare a report on the implementation of the laboratory activities.

- › 2,0 Student is not able to prepare a report on the implementation of the laboratory activities.
- › 3,0 Students are partially able to prepare a report on the implementation of the laboratory activities.
- › 3,5 Students are almost able to prepare a report on the implementation of the laboratory activities.
- › 4,0 Student is well able to prepare a report on the implementation of the laboratory activities.
- › 4,5 The student is almost able to prepare a report from the realization of the laboratory activities.
- › 5,0 The student is very good at preparing a report on the implementation of the laboratory activities.

Polish course name	KOMPOZYTY
English course name	COMPOSITES
Course code	WIP-MDL-D1-COM-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
30			30	

TEACHERS:

Prof. dr hab. inż. Katarzyna Braszczyńska-Malik.

COURSE OBJECTIVES:

- › **C1** Provide students with basic knowledge about composite materials and technologies of their production.
- › **C2** Introducing the issues of shaping the structure and properties through both the selection of components and various technological processes.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Basic knowledge of mathematics, physics and general chemistry. Basic knowledge in the field of metal, ceramic and polymer materials as well as basic issues of materials engineering and selection of measurement methods.
2. Ability to work independently and in a group.
3. Ability to use literature sources and internet resources.

COURSE CONTENT

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. Boczowski 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. Koszkuł 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 centra 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.

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.

- › 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.

Course name in Polish	JĘZYK OBCY (ANGIELSKI)
Course name in English	FOREIGN LANGUAGE (ENGLISH)
Course code	WIP-MDL-D1-FL-04
Field of study	Materials design and logistics
Level of qualification	First cycle degree programme
Form of study	Full-time
Semester	4
ECTS	2
Method of assessment	End-of-semester assessment

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
		30		

TEACHERS:

Katarzyna Stefańczyk, MA
Wioletta Będkowska, MA
Joanna Dziurkowska, MA
Małgorzata Engelking, MA
Marian Gałkowski, MA
Aleksandra Glińska, MA
Katarzyna Górniak-Cierpień, MA
Dorota Imiołczyk, MA
Aneta Kot, MA
Izabela Mishchil, MA
Monika Nitkiewicz, MA
Barbara Nowak, MA
Joanna Pabjańczyk-Musialska, MA
Dominika Rachwalik, MA
Przemysław Załęcki, MA

COURSE OBJECTIVES:

- › **C1** Practising and developing the basic language skills (listening, speaking, reading, writing) necessary to function in an international working environment and in everyday life.
- › **C2** Learning the necessary general and specialised vocabulary related to the field of study.
- › **C3** Acquiring intercultural knowledge and skills

REQUIRED KNOWLEDGE, SKILLS, COMPETENCES:

1. Command of a foreign language at the B1 level according to CEFR (the Common European Framework of Reference for Languages).
2. Ability to work independently and in a group.
3. Ability to use various sources of information, also in a foreign language.

COURSE CONTENT

CLASSES

- › **C1, C2** Lexical-grammatical structures. Communicative exercises.
- › **C3, C4** PLW * - professional skills and relationships.
- › **C5, C6** Lexical-grammatical structures. Communicative exercises.
- › **C7, C8** PLW * - business correspondence.
- › **C9, C10** PLW * - business meetings.
- › **C11, C12** Specialised text.**
- › **C13, C14** PLW *: business trips. Revision.
- › **C15, C16** Achievement test I.
- › **C17, C18** Lexical-grammatical structures. Communicative exercises.
- › **C19, C20** PLW * - professional success- lexical exercises.
- › **C21, C22** Work skills: multimedia presentation. Presenting figures and diagrams.
- › **C23, C24** PLW* Functions - giving opinions.
- › **C25, C26** Specialised text.** Revision.
- › **C27, C28** Achievement test II.
- › **C29, C30** Review. Individual student presentations.

*) PLW - Professional Language in the Workplace.

***)Topics of specialised texts closely related to the characteristics and scope of the field of study.

RESOURCE MATERIALS

1. K. Harding, L. Taylor: International Express - Intermediate, OUP 2019 r.
2. K. Harding, L. Taylor: International Express - Upper - Intermediate, OUP 2019 r.
3. D. Cotton, D. Falvey, S. Kent: Market Leader - Upper-Intermediate, Pearson 2016 r.
4. J. Kern: Career Paths - Mechanical Engineering, Express Publishing 2016 r.
5. I. Dubicka, M. O’Keeffe i inni: B1+ Business Partner, Pearson 2018 r.
6. M. Ibbotson: Engineering, Technical English for Professionals CUP 2021 r.
7. I. Dubicka, M. Rosenberg i inni: B2 Business Partner, Pearson 2018 r.
8. D. Bonamy: Technical English 3/4, Pearson 2013 r.

SUPPLMENTARY RESOURCE MATERIALS

1. V. Hollet, J. Sydes: Tech Talk OUP 2011 r.
2. I. Williams: English for Science and Engineering, Thomson LTD 2001 r.
3. N. Briger, A. Pohl: Technical English Vocabulary and Grammar, Summertown Publishing 2002 r.
4. V. Evans, J. Dooley, K. Rodgers: Career Paths: Natural Resources II - Mining, Egis 2018 r.
5. M. Ibbotson: Cambridge English for Engineering, CUP 2021 r.
6. C. Lloyd, J. A. Frazier: Career Paths – Engineering, Express Publishing 2018 r.
7. Aplikacje specjalistyczne: Mechanical Engineering.
8. E. J. Williams: Presentations in English, Macmillan 2008 r.
9. J. Dooley, V. Evans: Grammarway 2,3,4, Express Publishing 1999 oraz inne podręczniki do gramatyki.
10. Dictionary of Contemporary English, Pearson Longman 2009 oraz inne słowniki.
11. M. Duckworth, J. Hughes: Business Result - Upper - Intermediate, OUP 2018 r.
12. S. Sopranzi: Flash on English for Mechanics, Electronics and Technical Assistance, Eli 2016 r.

LEARNING OUTCOMES

- › **EU1** The student is able to use a foreign language to the extent necessary to function in a professional environment and typical everyday life situations.
- › **EU2** The student is able to read and understand a popular science text related to his/her field of study.
- › **EU3** The student is able to prepare and deliver a presentation in a foreign language using multimedia.

TEACHING TOOLS

- › General and specialised language textbooks.
- › Purpose built exercises.
- › Audiovisual exercises, multimedia presentations.
- › Internet resources, CUT e-learning platform.
- › Professional dictionaries and online dictionaries.

METHOD OF ASSESSMENT (F- FORMATIVE, S- SUMMATIVE)

- › **F1.** Grade for class preparation.
- › **F2.** Grade for class participation.
- › **F3.** Grade for the achievement test.
- › **F4.** Grade for the presentation.
- › **F5.** Grade for assignments completed in e-learning mode.
- › **P1.** End-of-semester grade*.

*) a prerequisite for obtaining an end-of-semester grade is receiving passing grades in all assignments and achievement tests.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures		
Seminars		
Tutorials	30	1,2
Laboratories		
Projects		

End-of-semester assessment		
Examination		
Total direct contact classes	30	1,2
Student's unassisted work		
Self-directed study of lectures		
Self-directed preparation for seminars		
Self-directed preparation for tutorials	8	0,32
Self-directed preparation for laboratories		
Self-directed preparation for projects		
Consultations	2	0,08
Preparation for the end-of-semester assessment/examination	10	0,4
Total student's unassisted work	20	0,8
Total student workload	50	2,0

SUPPLEMENTARY INFORMATION

Class times	Information on class times is available at the Office of the Centre for Foreign Languages and in USOS. Foreign language classes are held at the Centre for Foreign Languages at Czestochowa University of Technology, ul. Dąbrowskiego 69 as well as Moodle e-learning platform of Czestochowa University of Technology is used.
Consultation times	Information on consultations is provided to students during the first class of a given course, and is also placed on the website of the Centre for Foreign Languages - www.sjo.pcz.pl

MATRIX OF LEARNING OUTCOMES

Learning outcome	Reference of the given outcome to outcomes defined for the entire programme	Course objectives	Course content	Method of assessment
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EU 1	K_W09, K_U01, K_U09, K_K04,	C1, C2, C3	C1 - C30	F1, F2, F3, F5, P1
EU 2	K_W09, K_U01, K_U09, K_K04,	C1, C2, C3	C11 - C12, C25 - C26	F2, F5, P1
EU 3	K_W09, K_U01, K_U09, K_K04,	C1, C2, C3	C21 - C22, C29 - C30	F1, F4, F5

LEARNING OUTCOMES EVALUATION MATRIX

EU1 The student is able to use a foreign language to the extent necessary to function in a professional environment and typical everyday life situations.

- › 2,0 The student is not able to use a foreign language and use appropriate grammatical and lexical structures in a professional environment and typical everyday life situations in both written and oral form. The student's score in the achievement test is below 60%.
- › 3,0 The student is able to use the foreign language to a very limited extent, making numerous mistakes. The student scores between 60-75% in the test.
- › 3,5 A grade of 3,5 is given when the learning outcomes for a grade of 3,0 have been fully achieved, but the student has not fully acquired the learning outcomes for a grade of 4,0.
- › 4,0 The student is able to use the foreign language correctly but occasionally makes mistakes. The student scores between 80-85% in the test.
- › 4,5 A grade of 4,5 is given when the learning outcomes for a grade of 4,0 have been fully achieved, but the student has not fully acquired the learning outcomes for a grade of 5,0.
- › 5,0 The student is able to express himself/herself fluently and spontaneously on professional and social topics and in social interactions. The student's score in the achievement test is above 91%.

EU2 The student is able to read and understand a popular science text related to his/her field of study.

- › 2,0 The student is not able to understand a popular science text he/she reads. The student's score in the reading comprehension test is below 60%.

- › 3,0 The student understands only excerpts from the text he/she reads and has difficulty interpreting it. The student scores between 60-75% in the reading comprehension test.
- › 3,5 A grade of 3,5 is given when the learning outcomes for a grade of 3,0 have been fully achieved, but the student has not fully acquired the learning outcomes for a grade of 4,0.
- › 4,0 The student understands the meaning of the main topics of the text and is able to interpret them. The student scores between 80-85% in the reading comprehension test.
- › 4,5 A grade of 4,5 is given when the learning outcomes for a grade of 4,0 have been fully achieved, but the student has not fully acquired the learning outcomes for a grade of 5,0.
- › 5,0 The student understands everything he/she reads, including details. He/she is able to accurately interpret the text in his/her own words. The student's score in the reading comprehension test is above 91%.

EU3 The student is able to prepare and deliver a presentation in a foreign language using multimedia.

- › 2,0 The student is not able to prepare and deliver a presentation on a given topic.
- › 3,0 The student is able to prepare a presentation according to the established standards and deliver it but makes numerous language mistakes.
- › 3,5 A grade of 3,5 is given when the learning outcomes for a grade of 3,0 have been fully achieved, but the student has not fully acquired the learning outcomes for a grade of 4,0.
- › 4,0 The student is able to prepare a presentation according to the established standards and deliver it in a clear and communicative manner.
- › 4,5 A grade of 4,5 is given when the learning outcomes for a grade of 4,0 have been fully achieved, but the student has not fully acquired the learning outcomes for a grade of 5,0.
- › 5,0 The student is able to prepare a presentation according to the established standards and deliver it using rich lexis and advanced language and grammatical structures.

Course name in Polish	JĘZYK OBCY (NIEMIECKI)
Course name in English	FOREIGN LANGUAGE (GERMAN)
Course code	WIP-MDL-D1-FL-04
Field of study	Materials design and logistics
Level of qualification	First cycle degree programme
Form of study	Full-time
Semester	4
ECTS	2
Method of assessment	End-of-semester assessment

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
		30		

TEACHERS:

Mgr Henryk Juszcak,
Dr Marlena Wilk.

COURSE OBJECTIVES:

-
- › **C1** Practising and developing the basic language skills (listening, speaking, reading, writing) necessary to function in an international working environment and in everyday life.
 - › **C2** Learning the necessary general and specialised vocabulary related to the field of study.
 - › **C3** Acquiring intercultural knowledge and skills

REQUIRED KNOWLEDGE, SKILLS, COMPETENCES:

1. Command of a foreign language at the B1 level according to CEFR (the Common European Framework of Reference for Languages).
2. Ability to work independently and in a group.
3. Ability to use various sources of information, also in a foreign language.

COURSE CONTENT

CLASSES

- › **C1, C2** Lexical-grammatical structures: Communicative exercises.
 - › **C3, C4** PLW * Professional skills and relationships.
 - › **C5, C6** Lexical-grammatical structures: Communicative exercises.
 - › **C7, C8** PLW * Business correspondence.
 - › **C9, C10** PLW * Business meetings.
 - › **C11, C12** Specialised text.**
 - › **C13, C14** PLW * Business trips. Revision.
 - › **C15, C16** Achievement test I.
 - › **C17, C18** Lexical - grammatical structures: Communicative exercises.
 - › **C19, C20** PLW * Professional success - lexical exercises.
 - › **C21, C22** Work skills: multimedia presentation. Presenting figures and diagrams.
 - › **C23, C24** PLW* Functions - giving opinions.
 - › **C25, C26** Specialised text.** Revision.
 - › **C27, C28** Achievement test II.
 - › **C29, C30** Review. Individual student presentations.
- *) PLW - Professional Language in the Workplace.

***)Topics of specialised texts closely related to the characteristics and scope of the field of study.

RESOURCE MATERIALS

1. Fügert N., Grosser R., DaF im Unternehmen B1, Kurs - und Übungsbuch, Klett, 2016 r.
2. Hagner V., Schlüter S., Im Beruf neu, Hueber Verlag, 2021 r.
3. Braunert J., Schlenker W., Unternehmen Deutsch, E. Klett, Stuttgart, 2014 r.
4. Sander I., Braun B., Doubek M., DaF Kompakt D, Klett, Stuttgart, 2015 r.
5. Hilper, S., Kalender S., Kerner M., Schritte international 5, Hueber, 2012 r.
6. Guenat G., Hartmann P., Deutsch für das Berufsleben B1, E. Klett Sprachen GmbH, 2015 r.
7. Braun-Podeschwa J., Habersack Ch., Pude A., Menschen, Huber, 2018 r.
8. Funk H, Kuhn Ch., Studio B1 + kurs DVD, Cornelsen BC edu, Berlin 2012 r.
9. Bosch G., Dahmen K., Schritte international, Hueber Verlag, Ismaning, 2012 r.
10. Eismann V., Erfolgreich bei Präsentationen, Cornelsen Verlag, Berlin 2016 r.
11. R.Kärchner-Ober, Deutsch für Ingenieure B1-B2, Hueber, Warszawa 2015 r.

12. Baberadova H., Język niemiecki w ekonomii: Fremdsprache Deutsch - Finanzen B2/C1, LektorKlett, 2012 r.

SUPPLMENTARY RESOURCE MATERIALS

1. Wielki Słownik niemiecko-polski/polsko-niemiecki PONS, LektorKlett, Kraków 2010 r.
2. Corbbeil J.-C., Archambault A., Słownik obrazkowy polsko-niemiecki, Klett, Poznań 2007 r.
3. Tarkiewicz U., Deutsche Fachtexte leichter gemacht, Wydawnictwa PCz, Częstochowa 2009 r.
4. Wszyński J., Sehen, Hören, Verstehen - Ćwiczenia do materiałów audiowizualnych, Wyd. Politechniki Częstochowskiej, Częstochowa 2008 r.
5. Czasopisma: magazin-deutschland.de, Bildung&Wissenschaft.
6. Słowniki mono i bilingwalne, również on-linowe.
7. Aplikacje specjalistyczne oraz zasoby Internetu.

LEARNING OUTCOMES

- › **EU1** The student is able to use a foreign language to the extent necessary to function in a professional environment and typical everyday life situations.
- › **EU2** The student is able to read and understand a popular science text related to his/her field of study.
- › **EU3** The student is able to prepare and deliver a presentation in a foreign language using multimedia.

TEACHING TOOLS

- › General and specialised language textbooks.
- › Purpose built exercises.
- › Audiovisual exercises, multimedia presentations.
- › Internet resources, CUT e-learning platform.
- › Professional dictionaries and online dictionaries.

METHOD OF ASSESSMENT (F- FORMATIVE, S- SUMMATIVE)

- › **F1.** Grade for class preparation.
- › **F2.** Grade for class participation.

- › **F3.** Grade for the achievement test.
- › **F4.** Grade for the presentation.
- › **F5.** Grade for assignments completed in e-learning mode.
- › **P1.** End-of-semester grade*.

*) a prerequisite for obtaining an end-of-semester grade is receiving passing grades in all assignments and achievement tests.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures		
Seminars		
Tutorials	30	1,2
Laboratories		
Projects		
End-of-semester assessment		
Examination		
Total direct contact classes	30	1,2
Student's unassisted work		
Self-directed study of lectures		
Self-directed preparation for seminars		
Self-directed preparation for tutorials	8	0,32
Self-directed preparation for laboratories		
Self-directed preparation for projects		
Consultations	2	0,08
Preparation for the end-of-semester assessment/examination	10	0,4
Total student's unassisted work	20	0,8
Total student workload	50	2,0

SUPPLEMENTARY INFORMATION

Class times	Information on class times is available at the Office of the Centre for Foreign Languages and in USOS. Foreign language classes are held at the Centre for Foreign Languages at Czestochowa University of Technology, ul. Dąbrowskiego 69 as well as Moodle e-learning platform of Czestochowa University of Technology is used.
Consultation times	Information on consultations is provided to students during the first class of a given course, and is also placed on the website of the Centre for Foreign Languages - www.sjo.pcz.pl

MATRIX OF LEARNING OUTCOMES

Learning outcome	Reference of the given outcome to outcomes defined for the entire programme	Course objectives	Course content	Method of assessment
EU 1	K_W09, K_U01, K_U09, K_K04,	C1, C2, C3	C1 - C30	F1, F2, F3, F5, P1
EU 2	K_W09, K_U01, K_U09, K_K04,	C1, C2, C3	C11 - C12, C25 - C26	F2, F5, P1
EU 3	K_W09, K_U01, K_U09, K_K04,	C1, C2, C3	C21 - C22, C29 - C30	F1, F4, F5

LEARNING OUTCOMES EVALUATION MATRIX

EU1 The student is able to use a foreign language to the extent necessary to function in a professional environment and typical everyday life situations.

- › 2,0 The student is not able to use a foreign language and use appropriate grammatical and lexical structures in a professional environment and typical

everyday life situations in both written and oral form. The student's score in the achievement test is below 60%.

- › 3,0 The student is able to use the foreign language to a very limited extent, making numerous mistakes. The student scores between 60-75% in the test.
- › 3,5 A grade of 3,5 is given when the learning outcomes for a grade of 3,0 have been fully achieved, but the student has not fully acquired the learning outcomes for a grade of 4,0.
- › 4,0 The student is able to use the foreign language correctly but occasionally makes mistakes. The student scores between 80-85% in the test.
- › 4,5 A grade of 4,5 is given when the learning outcomes for a grade of 4,0 have been fully achieved, but the student has not fully acquired the learning outcomes for a grade of 5,0.
- › 5,0 The student is able to express himself/herself fluently and spontaneously on professional and social topics and in social interactions. The student's score in the achievement test is above 91%.

EU2 The student is able to read and understand a popular science text related to his/her field of study.

- › 2,0 The student is not able to understand a popular science text he/she reads. The student's score in the reading comprehension test is below 60%.
- › 3,0 The student understands only excerpts from the text he/she reads and has difficulty interpreting it. The student scores between 60-75% in the reading comprehension test.
- › 3,5 A grade of 3,5 is given when the learning outcomes for a grade of 3,0 have been fully achieved, but the student has not fully acquired the learning outcomes for a grade of 4,0.
- › 4,0 The student understands the meaning of the main topics of the text and is able to interpret them. The student scores between 80-85% in the reading comprehension test.
- › 4,5 A grade of 4,5 is given when the learning outcomes for a grade of 4,0 have been fully achieved, but the student has not fully acquired the learning outcomes for a grade of 5,0.
- › 5,0 The student understands everything he/she reads, including details. He/she is able to accurately interpret the text in his/her own words. The student's score in the reading comprehension test is above 91%.

EU3 The student is able to prepare and deliver a presentation in a foreign language using multimedia.

- › 2,0 The student is not able to prepare and deliver a presentation on a given topic.
- › 3,0 The student is able to prepare a presentation according to the established standards and deliver it but makes numerous language mistakes.
- › 3,5 A grade of 3,5 is given when the learning outcomes for a grade of 3,0 have been fully achieved, but the student has not fully acquired the learning outcomes for a grade of 4,0.
- › 4,0 The student is able to prepare a presentation according to the established standards and deliver it in a clear and communicative manner.
- › 4,5 A grade of 4,5 is given when the learning outcomes for a grade of 4,0 have been fully achieved, but the student has not fully acquired the learning outcomes for a grade of 5,0.
- › 5,0 The student is able to prepare a presentation according to the established standards and deliver it using rich lexis and advanced language and grammatical structures.

Polish course name	PROJEKTOWANIE I WYTWARZANIE WYROBÓW W TECHNOLOGII DRUKU 3D
English course name	DESIGN AND MANUFACTURE OF PRODUCTS IN 3D PRINTING TECHNOLOGY
Course code	WIP-MDL-D1-DAMOP-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			30	

TEACHERS:

Dr inż. Marcin Kwapisz.

COURSE OBJECTIVES:

- › **C1** Familiarizing students with various 3D printing technologies.
- › **C2** Acquiring the knowledge and skills necessary to solve engineering problems in the field of modeling materials and elements and their production with the use of 3D techniques.
- › **C3** Acquiring knowledge in the field of modeling materials and products with additive techniques.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Knowledge of the basics of computer science, computer operation, CAD programs.
2. The ability to reason logically and build logical sentences.
3. Ability to use literature sources and internet resources.
4. The ability to correctly interpret your own actions.

5. The student has a basic knowledge of materials science.
6. He can define the relationship between the type of material and its properties.
7. He knows the basics of manufacturing technology.

COURSE CONTENT

LECTURE

- › **L1** History of the development of 3D printing methods.
- › **L2** 3D printing methods.
- › **L3** Fundamentals of additive manufacturing techniques.
- › **L4** Introduction to rapid prototyping methods.
- › **L5** 3D Scanners.
- › **L6** Materials used in 3D printing.
- › **L7** Biofilters and bio-printing.
- › **L8** Stereolithography.
- › **L9** STL file format.
- › **L10** Assessment of 3D printing parameters and their impact on product quality.
- › **L11** Defining surfaces in 3D systems.
- › **L12** Advanced methods of solid modelling.
- › **L13** Advanced techniques of 3D modelling.
- › **L14, L15** Preparation of a file for 3D printing.

LABORATORY

- › **Lab1, Lab2** Introduction to laboratory activities.
- › **Lab3 - Lab6** Geometric modelling with CAD tools.
- › **Lab7 - Lab10** Optical methods of mapping objects - 3D scanning.
- › **Lab11 - Lab14** Modelling based on a 3D scan.
- › **Lab15 - Lab18** Preparation of digital 3D CAD models based on 3D scans.
- › **Lab19, Lab20** Analysis of material properties.
- › **Lab21 - Lab30** Making 3D prints - preparing a model in STL format, printing the model, processing 3D prints from plastics, assessing dimensional and shape accuracy.

BASIC REFERENCES

1. France A.K.: Świat druku 3D. Helion, Gliwice 2014 r.

2. Knosala R.: Inżynieria Produkcji, Kompendium Wiedzy, Polskie Wydawnictwo Ekonomiczne, Warszawa 2017 r.
3. Kwapisz M.: Charakterystyka metod druku 3D, Inżynieria Zarządzania Cyfryzacja Produkcji, Aktualności badawcze 1, Warszawa 2019 r.
4. User Manuals XYZ printing da Vinci 1.0 Pro 3in1 [2019 r.]
www.xyzprinting.com

SUPPLEMENTARY REFERENCE MATERIALS

Internet resources

LEARNING OUTCOMES

- › **EU1** Has knowledge of computer modelling used in the design process.
- › **EU2** Has knowledge of the use of 3D methods in high-speed manufacturing technology.
- › **EU3** Has knowledge of innovative/advanced techniques for the production of models, semi-finished products and finished products from polymer, metal, ceramic and composite materials, including obtaining elements with a gradient structure.
- › **EU4** Can design and implement the technological process of a model, semi-finished product, finished element using a selected 3D technique, and assess the material and geometric quality of the detail obtained.

TEACHING TOOLS

- › Lecture with the use of audiovisual means.
- › Laboratory - desktop computers.
- › Computer software, CAD software, software for operating 3D printers.
- › 3D printers.
- › Teaching materials prepared by the teacher.
- › E-learning platform of the Częstochowa University of Technology, or other distance learning tools.

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

- › **F1.** Assessment of the implementation of tasks included in the curriculum.

- › **F2.** Assessment of the mastery of the teaching material being the subject of laboratory tasks - final test.
- › **F3.** Assessment of activity during classes.
- › **P1.** Assessment of the mastery of the teaching material within the lectures - final test.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures	15	0,6
Seminar		
Classes		
Laboratory	30	1,2
Project		
Test	2	0,08
Exam		
Total contact hours	47	1,88
Student's own work		
Getting acquainted with the indicated literature	10	0,4
Preparation for seminar		
Preparation for classes		
Preparation for lab	10	0,4
Project preparation		
Consultation	2	0,08
Preparation for the test	6	0,24
Total student's own work	28	1,12
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
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Information about the consultation (time + place)	https://wip.pcz.pl/dla-studentow/konsultacje-dla-studentow
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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_U04,	C1, C2, C3	L1 - L15, Lab1 - Lab30	F1- F3, P1
EU 2	K_W01, K_U04,	C1, C2, C3	L1 - L15, Lab1 - Lab30	F1- F3, P1
EU 3	K_W01, K_U04,	C1, C2, C3	L1 - L15, Lab1 - Lab30	F1- F3, P1
EU 4	K_W01, K_U04,	C1, C2, C3	L10 - L15, Lab1 - Lab30	F1- F3, P1

FORM OF ASSESSMENT - DETAILS

EU1 Has knowledge of computer modeling used in the design process.

- › 2,0 Has no knowledge of computer modeling used in the design process.
- › 3,0 Has sufficient knowledge of computer modeling used in the design process.
- › 3,5 Has sufficient knowledge of computer modeling used in the design process.
- › 4,0 Has a good knowledge of computer modeling used in the design process.
- › 4,5 Has a good plus degree of knowledge in the field of computer modeling used in the design process.
- › 5,0 Has a very good knowledge of computer modeling used in the design process.

EU2 Has knowledge of the use of 3D methods in high-speed manufacturing technology.

- › 2,0 Has no knowledge of the use of 3D methods in the rapid production technology.
- › 3,0 Has sufficient knowledge of the use of 3D methods in the rapid production technology.

- › 3,5 Has sufficient knowledge of the use of 3D methods in rapid production technology.
- › 4,0 Has a good knowledge of the use of 3D methods in rapid production technology.
- › 4,5 Has good knowledge of the use of 3D methods in high-speed manufacturing technology.
- › 5,0 Has a very good knowledge of the use of 3D methods in the rapid production technology.

EU 3 Has knowledge of innovative/advanced techniques for the production of models, semi-finished products and finished products from polymer, metal, ceramic and composite materials, including obtaining elements with a gradient structure.

- › 2,0 There is no knowledge of innovative/advanced techniques for producing models, semi-finished products and finished products from polymer, metal, ceramic and composite materials, including obtaining elements with a gradient structure.
- › 3,0 Has knowledge of innovative/advanced techniques for the production of models, semi-finished products and finished products from polymer, metal, ceramic and composite materials, including obtaining elements with a gradient structure to a sufficient degree.
- › 3,5 Has knowledge of innovative/advanced techniques for the production of models, semi-finished products and finished products from polymer, metal, ceramic and composite materials, including obtaining elements with a gradient structure sufficiently plus
- › 4,0 Has knowledge of innovative/advanced techniques for the production of models, semi-finished products and finished products from polymer, metal, ceramic and composite materials, including obtaining elements with a good gradient structure.
- › 4,5 Has knowledge of innovative/advanced techniques for the production of models, semi-finished products and finished products from polymer, metal, ceramic and composite materials, including obtaining elements with a good-plus degree gradient structure.
- › 5,0 Has knowledge of innovative/advanced techniques for the production of models, semi-finished products and finished products from polymer, metal,

ceramic and composite materials, including obtaining elements with a very good gradient structure.

EU 4 Is able to design and implement the technological process of a model, semi-finished product, finished element using the selected 3D technique, and can assess the material and geometric quality of the obtained detail.

- › 2,0 Cannot design and implement the technological process of a model, semi-finished product, finished element using the selected 3D technique, and assess the material and geometric quality of the detail obtained.
- › 3,0 Is able to design and implement the technological process of a model, semi-finished product, ready element using a selected 3D technique, and can assess the material and geometric quality of the obtained detail sufficiently
- › 3,5 Is able to design and implement the technological process of a model, semi-finished product, ready element using the selected 3D technique, and can assess the material and geometric quality of the obtained detail to a sufficiently plus degree.
- › 4,0 Can design and implement the technological process of a model, a semi-finished product, a finished element using a selected 3D technique, and can assess the material and geometric quality of the obtained detail to a good degree
- › 4,5 Is able to design and implement the technological process of a model, semi-finished product, finished element using the selected 3D technique, and can assess the material and geometric quality of the obtained detail to a good plus degree.
- › 5,0 Is able to design and implement the technological process of a model, semi-finished product, finished element using a selected 3D technique, and can assess the material and geometric quality of the obtained detail to a very high degree.

Polish course name	WYTWARZANIE WYROBÓW METODAMI PRZYROSTOWYMI
English course name	MANUFACTURE OF PRODUCTS WITH THE USE OF INCREMENTAL METHODS
Course code	WIP-MDL-D1-MOPWT-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			30	

TEACHERS:

Dr inż. Marcin Kwapisz.

COURSE OBJECTIVES:

- › **C1** Familiarizing students with incremental techniques.
- › **C2** Acquiring the knowledge and skills necessary to solve engineering problems in the field of modelling materials and elements and their production with the using incremental methods.
- › **C3** Acquiring knowledge in the field of modelling materials and products with additive techniques.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Knowledge of the basics of computer science, computer operation, CAD programs.
2. The ability to reason logically and build logical sentences.
3. Ability to use literature sources and internet resources.
4. The ability to correctly interpret your own actions.

5. The student has a basic knowledge of materials science.
6. He can define the relationship between the type of material and its properties.
7. He knows the basics of manufacturing technology.

COURSE CONTENT

LECTURE

- › **L1** History of the development incremental methods.
- › **L2** Incremental methods.
- › **L3** Fundamentals of manufacturing products using incremental methods.
- › **L4** Methods of rapid prototyping.
- › **L5** 3D scanners.
- › **L6** Materials used in additive technologies.
- › **L7** Stereolithography.
- › **L8** Biofilters and bio-printing
- › **L9** Preparation of file in STL format.
- › **L10** Influence of 3D printing parameters on product quality.
- › **L11** Defining surfaces in 3D modelling systems.
- › **L12, L13** Advanced solid modelling methods.
- › **L14, L15** Preparation of a file for 3D printing

LABORATORY

- › **Lab1, Lab2** Introduction to laboratory activities.
- › **Lab3 - Lab6** Geometric modelling with CAD software.
- › **Lab7 - Lab10** Object mapping methods - 3D scanning.
- › **Lab11 - Lab14** Modeling of objects based on a 3D scan.
- › **Lab15 - Lab18** Creating digital CAD spatial models.
- › **Lab19, Lab20** Analysis of properties of materials used in additive methods.
- › **Lab21 - Lab30** Printing with incremental methods - model preparation in STL format, model printing, processing of 3D plastic prints, assessment of the dimensional and shape accuracy of products obtained with incremental methods.

BASIC REFERENCES

1. France A.K.: Świat druku 3D. Helion, Gliwice 2014 r.

2. Knosala R.: Inżynieria Produkcji Kompendium Wiedzy, Polskie Wydawnictwo Ekonomiczne, Warszawa 2017 r.
3. Kwapisz M.: Charakterystyka Metod druku 3D, Inżynieria Zarządzania Cyfryzacja Produkcji, Aktualności badawcze 1, Warszawa 2019 r.
4. User Manuals XYZ printing da Vinci 1.0 Pro 3in1 [2019 r.]
www.xyzprinting.com

SUPPLEMENTARY REFERENCE MATERIALS

Internet resources

LEARNING OUTCOMES

- › **EU1** Student has knowledge of computer modeling used in the 3D design process.
- › **EU2** Student has knowledge of the use of incremental methods.
- › **EU3** Student has knowledge in the field of advanced techniques of manufacturing models, semi-finished products and finished products from polymer, metal, ceramic and composite materials.
- › **EU4** Student is able to design and implement the technological process of a model, semi-finished product, finished element using the selected incremental technique, and assess the material and geometrical quality of the obtained detail.

TEACHING TOOLS

- › Lecture with the use of audiovisual means.
- › Laboratory - desktop computers.
- › Computer software, CAD software, software for operating 3D printers.
- › 3D printers.
- › Teaching materials prepared by the teacher.
- › E-learning platform of the Częstochowa University of Technology, or other distance learning tools.

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

- › **F1.** Assessment of the implementation of tasks included in the curriculum.

- › **F2.** Assessment of the mastery of the teaching material being the subject of laboratory tasks - final test.
- › **F3.** Assessment of activity during classes.
- › **P1.** Assessment of the mastery of the teaching material within the lectures - final test.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures	15	0,6
Seminar		
Classes		
Laboratory	30	1,2
Project		
Test	2	0,08
Exam		
Total contact hours	47	1,88
Student's own work		
Getting acquainted with the indicated literature	10	0,4
Preparation for seminar		
Preparation for classes		
Preparation for lab	10	0,4
Project preparation		
Consultation	2	0,08
Preparation for the test	6	0,24
Total student's own work	28	1,12
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
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Information about the consultation (time + place)	https://wip.pcz.pl/dla-studentow/konsultacje-dla-studentow
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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_U04,	C1, C2, C3	L1 - L15, Lab1 - Lab30	F1, F2, F3, P1
EU 2	K_W01, K_U04,	C1, C2, C3	L1 - L15, Lab1 - Lab30	F1, F2, F3, P1
EU 3	K_W01, K_U04,	C1, C2, C3	L1 - L15, Lab1 - Lab30	F1, F2, F3, P1
EU 4	K_W01, K_U04,	C1, C2, C3	L10 - L15, Lab1 - Lab30	F1, F2, F3, P1

FORM OF ASSESSMENT - DETAILS

EU1 Student has knowledge of computer modeling used in the 3D design process.

- › 2,0 Has no knowledge of computer modeling used in the 3D design process.
- › 3,0 Has sufficiently knowledge of computer modelling in the 3D design process.
- › 3,5 Has sufficient knowledge of computer modelling in the 3D design process.
- › 4,0 Has a good knowledge of computer modelling in the 3D design process.
- › 4,5 Has a good plus degree of computer modelling in the 3D design process.
- › 5,0 Has a very good knowledge of computer modelling in the 3D design process.

EU2 Student has knowledge of the use of incremental methods.

- › 2,0 Has no knowledge of the use of incremental methods.
- › 3,0 Has sufficient knowledge of the use of incremental methods.
- › 3,5 Has sufficient knowledge of the use of incremental methods.
- › 4,0 Has a good knowledge of the use of incremental methods.
- › 4,5 Has good knowledge of the use of incremental methods.
- › 5,0 Has a very good knowledge of the use of incremental methods.

EU 3 Student has knowledge in the field of advanced techniques of manufacturing models, semi-finished products and finished products from polymer, metal, ceramic and composite materials.

- › 2,0 There is no knowledge of advanced techniques for producing models, semi-finished products and finished products from polymer, metal, ceramic and composite materials.
- › 3,0 Has knowledge of advanced techniques for the production of models, semi-finished products and finished products from polymer, metal, ceramic and composite materials.
- › 3,5 Has knowledge of advanced techniques for the production of models, semi-finished products and finished products from polymer, metal, ceramic and composite materials sufficiently plus
- › 4,0 Has knowledge of advanced techniques for the production of models, semi-finished products and finished products from polymer, metal, ceramic and composite materials to a good degree
- › 4,5 Has knowledge of advanced techniques for the production of models, semi-finished products and finished products from polymer, metal, ceramic and composite materials, including obtaining elements with a good-plus degree gradient structure to a good plus
- › 5,0 Very good knowledge of advanced techniques for the production of models, semi-finished products and finished products from polymer, metal, ceramic and composite materials.

EU 4 Student is able to design and implement the technological process of a model, semi-finished product, finished element using the selected incremental technique, and can assess the material and geometric quality of the obtained detail.

- › 2,0 Cannot design and implement the technological process of a model, semi-finished product, finished element using the selected incremental technique, and assess the material and geometric quality of the detail obtained.
- › 3,0 Is able to design and implement the technological process of a model, semi-finished product, ready element using a selected incremental technique, and can assess the material and geometric quality of the obtained detail sufficiently
- › 3,5 Is able to design and implement the technological process of a model, semi-finished product, ready element using the selected incremental technique, and

can assess the material and geometric quality of the obtained detail to a sufficiently plus degree.

- › 4,0 Is able to design and implement the technological process of a model, a semi-finished product, a finished element using a selected incremental technique, and can assess the material and geometric quality of the obtained detail to a good degree
- › 4,5 Is able to design and implement the technological process of a model, semi-finished product, finished element using the selected incremental technique, and can assess the material and geometric quality of the obtained detail to a good plus degree.
- › 5,0 Is able to design and implement the technological process of a model, semi-finished product, finished element using a selected incremental technique, and can assess the material and geometric quality of the obtained detail to a very high degree.

Polish course name	ZARZĄDZANIE PERSONELEM
English course name	PERSONNEL MANAGEMENT
Course code	WIP-MDL-D1-PM-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	Test

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15		15		

TEACHERS:

Dr hab. inż. Rafał Prusak, prof. PCz.,

Dr inż. Marzena Ogórek,

Dr inż. Dominika Strycharska.

COURSE OBJECTIVES:

- › **C1** Providing students with knowledge about the specificity of human resources in the enterprise and the methods and techniques of managing these resources.
- › **C2** Acquisition of practical skills by students in identifying competences and defining competency gaps and shaping professional development programs.
- › **C3** Acquisition of practical skills by students in the analysis and planning of human resources and job evaluation.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Knowledge of the basics of organization and management in the field of shaping organizational structures, management styles, elements of the enterprise environment.
2. Knowledge of descriptive statistics and the basics of forecasting.
3. Ability to work independently and in a group.

4. Ability to use literature sources and internet resources.

COURSE CONTENT

LECTURE

- › **L1** The role of the human factor in enterprise management processes. Characteristics of basic models of human resource management.
- › **L2** Types of personnel strategies and their integration with the basic strategy of the company.
- › **L3** The concept of the labor market and the factors influencing the demand and supply of human resources.
- › **L4** Characteristics of the concept of organizational culture. The role of norms and patterns of behavior in people management.
- › **L5** Methods and techniques of work analysis. Impact of job analysis results on current and future human resource activities.
- › **L6** Types of planning in the field of human resources. Information sources and techniques of human resource planning.
- › **L7** Recruitment of employees. The procedure of the recruitment process on the internal and external market.
- › **L8** The course of activities in the selection of candidates. Interview Guidelines.
- › **L9** Employee evaluation system, its goals and functions, as well as evaluation criteria and methods.
- › **L10** The concept and theories of motivating. Principles of applying effective motivation.
- › **L11, L12, L13, L14, L15** The concept of human capital. Methods and techniques of its evaluation and development.

CLASSES

- › **C1** Elements of a human resource management system. Identification of the components of personnel functions in the enterprise.
- › **C2** Organization of the personnel department in the enterprise.
- › **C3** Factors shaping the labor market. External labor market and employment conditions legislation.
- › **C4** Analysis of the employment structure, level of fluctuation and labor costs.

- › **C5** The impact of organizational culture on the functioning of the organization. The relationship between organizational culture and the company's functioning on the market.
- › **C6, C7, C8** Identification of strategic competences and determining their impact on the company's performance. Creating competence portfolios of job positions and employees.
- › **C9, C10, C11** The use of mathematical and statistical methods for quantitative employment planning.
- › **C12, C13** Work valuation with the use of analytical - point and summary methods.
- › **C14, C15** Analysis of the value of intellectual capital of the enterprise.

BASIC REFERENCES

1. Armstrong M.: Zarządzanie zasobami ludzkimi, ABC, Kraków 2003 r.
2. Baron A., Armstrong M., Zarządzanie kapitałem ludzkim. Uzyskiwanie wartości dodanej dzięki ludziom, Wolters Kluwer, Karków 2008 r.
3. Bochniarz P., Gugąła K., Budowanie i pomiar kapitału ludzkiego w firmie, Wydawnictwo Poltext, Warszawa 2005 r.
4. Gorczycka E., Wybrane problemy zarządzania kapitałem ludzkim, Wydawnictwo Politechniki Częstochowskiej, Częstochowa 2008 r.
5. Juchnowicz M., Elastyczne zarządzanie kapitałem ludzkim w organizacji wiedzy, Centrum Doradztwa i Informacji Difin, Warszawa 2007 r.
6. Król H., Ludwicyński A., Zarządzanie zasobami ludzkimi. Tworzenie kapitału ludzkiego organizacji, Wydawnictwo Naukowe PWN, Warszawa 2006 r.
7. Poczowski A, W kierunku jakości kapitału ludzkiego, Instytut Pracy i Spraw Socjalnych, Warszawa 2007 r.
8. Stoner J. A. F., Freeman R. E., Gilbert D. R., Kierowanie, PWE, Warszawa 2001 r.
9. Trompenaars F., Hampden-Turner Ch., Siedem wymiarów kultury. Znaczenie różnic kulturowych w działalności gospodarczej, Oficyna Ekonomiczna, Kraków 2002 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. Griffin R.W., Podstawy zarządzania organizacjami, Wydawnictwo Naukowe PWN, Warszawa 2006 r.
2. Drucker P. F., Zarządzanie w XXI wieku, Muza SA, Warszawa 2000 r.
3. Prusak R., Kształtowanie struktury kapitału intelektualnego przedsiębiorstwa, Politechnika Częstochowska, Prace Naukowe Wydziału Inżynierii Procesowej, Materiałowej i Fizyki Stosowanej, Seria: Monografie Nr 34, Częstochowa 2013 r.

LEARNING OUTCOMES

- › **EU1** The student knows the basic personnel strategies and understands their relationship with other areas of the company's operation.
- › **EU2** The student is able to analyze human resources in the organization in the context of their structures and dynamics of change, as well as conduct a study of labor costs.
- › **EU3** The student knows the theoretical basics of assessing the value of human capital and intellectual capital in a company.

TEACHING TOOLS

- › Multimedia presentations.
- › Manuals, scripts.
- › Laboratory equipment and guides.
- › CUT e-learning platform (possible use).

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

- › **F1.** Assessment of knowledge in the field of basic concepts in the field of organization and business management.
- › **F2.** Assessment of self-preparation of exercises.
- › **P1.** 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	2	0,08
Exam		
Total contact hours	32	1,28
Student's own work		
Getting acquainted with the indicated literature	5	0,2
Preparation for seminar		
Preparation for classes	5	0,2
Preparation for lab		
Project preparation		
Consultation	2	0,08
Preparation for the test	6	0,24
Total student's own work	18	0,72
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_W07,	C1, C2	L1 - L15	F1, F2

	K_U07, K_K02,		C1 - C15	P1
EU 2	K_W07, K_U07, K_K02,	C1, C2, C3	L5 - L15 C4 - C15	F1, F2 P1
EU 3	K_W07, K_U07, K_K02,	C1, C2, C3	L5 - L15 C4 - C15	F1, F2 P1

FORM OF ASSESSMENT - DETAILS

EU1 The student knows the basic personnel strategies and understands their relationship with other areas of the company's operation.

- › 2,0 The student does not know basic personnel strategies and does not understand their relationship with other areas of the company's operation.
- › 3,0 The student knows the basic personnel strategies and understands their relationship with other areas of the company's operation to a satisfactory degree.
- › 3,5 The student knows the basic personnel strategies and understands their relationship with other areas of the company's operation to a satisfactory plus degree.
- › 4,0 The student knows the basic personnel strategies and understands their relationship with other areas of the company's operation to a good degree.
- › 4,5 The student knows the basic personnel strategies and understands their relationship with other areas of the company's operation to a good plus degree.
- › 5,0 The student knows the basic personnel strategies and understands their relationship with other areas of the company's operation to a very good degree.

EU2 The student is able to analyze human resources in the organization in the context of their structures and dynamics of change, as well as conduct a study of labor costs.

- › 2,0 The student is not able to carry out an analysis of human resources in the organization in the context of their structures and dynamics of change, as well as to carry out a study of labor costs.
- › 3,0 The student is able to analyze human resources in the organization in the context of their structures and dynamics of changes, as well as conduct a satisfactory research on labor costs.

- › 3,5 The student is able to analyze human resources in the organization in the context of their structures and dynamics of changes, as well as conduct a satisfactory plus labor cost study.
- › 4,0 The student is able to analyze human resources in the organization in the context of their structures and dynamics of change, as well as conduct a good labor cost study.
- › 4,5 The student is able to analyze human resources in the organization in the context of their structures and dynamics of change, as well as conduct a study of labor costs to a good plus degree.
- › 5,0 The student is able to analyze human resources in the organization in the context of their structures and dynamics of change, as well as conduct a study of labor costs to a very good degree.

EU 3 The student knows the theoretical basics of assessing the value of human capital and intellectual capital in the enterprise.

- › 2,0 The student does not know the theoretical foundations of the assessment of the value of human capital and intellectual capital in the enterprise.
- › 3,0 The student knows the theoretical foundations of the assessment of the value of human capital and intellectual capital in the enterprise to a satisfactory degree.
- › 3,5 The student knows the theoretical foundations of the assessment of the value of human capital and intellectual capital in a company to a satisfactory plus degree.
- › 4,0 The student knows the theoretical basics of the assessment of the value of human capital and intellectual capital in the enterprise to a good degree.
- › 4,5 The student knows the theoretical basis for the assessment of the value of human capital and intellectual capital in a company to a good plus degree.
- › 5,0 The student knows the theoretical basics of assessing the value of human capital and intellectual capital in a company to a very good degree.

Polish course name	KSZTAŁTOWANIE KADRY KIEROWNICZEJ
English course name	DEVELOPING OF MANAGEMENT
Course code	WIP-MDL-D1-DOM-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	Test

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15		15		

TEACHERS:

Dr hab. inż. Rafał Prusak, prof. PCz.,

Dr inż. Marzena Ogórek,

Dr inż. Dominika Strycharska.

COURSE OBJECTIVES:

- › **C1** Providing students with knowledge in the field of shaping the personality of managers.
- › **C2** To familiarize students with the issues of effective human resource management in enterprises.
- › **C3** Acquisition of practical skills by students in carrying out analyzes of the effectiveness of the implementation of managerial functions.
- › **C4** Provide students with knowledge that allows them to make basic decisions in the area of human resources in the context of the implementation of strategic goals of the enterprise.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Knowledge of management in the area of planning and decision making at the strategic level and types of organizational structures.

2. Knowledge of human resource management, the basics of organization and management
3. Ability to work independently and in a group.
4. Ability to use literature sources and internet resources.

COURSE CONTENT

LECTURE

- › **L1** Etymology and meaning of the concept of management.
- › **L2** The concept of power, its sources and methods of use. The division of management styles in different perspectives. Psychological determinants of people's behavior at work.
- › **L3** Characteristics of the basic personal patterns of managers. Analysis of basic errors in the management process.
- › **L4, L5** Building employee teams. Group development phases.
- › **L6, L7** Analysis of the roles performed by the group participants. The importance of the proper selection of employees from the point of view of the effectiveness of employee teams.
- › **L8, L9** Methods of analyzing and resolving conflicts in organizations.
- › **L10, L11** Characteristics of the basic techniques of managing employee teams. Analysis of the strengths and weaknesses of individual solutions. Possibilities of using selected models in specific work situations.
- › **L12** Personal marketing.
- › **L13** Basics of negotiating.
- › **L14** Shaping human capital in enterprises.
- › **L15** Human resource management in international organizations.

CLASSES

- › **C1** Analysis of factors influencing the effectiveness of the management process.
- › **C2, C3** Resource management - analysis of the effectiveness of approaches and methods.
- › **C4** Sieve and human capital models in the process of employment planning.
- › **C5, C6** Leadership styles in the people management process.
- › **C7, C8** Personnel formation in the enterprise.
- › **C9** Motivating the human resources of the enterprise.
- › **C10** Controlling and promoting staff in the enterprise (evaluation methods).

- › **C11, C12** Personality analysis of management representatives.
- › **C13, C14** Importance of leadership and social skills of managerial staff.
- › **C15** Economic and financial analysis of human capital in an enterprise.

BASIC REFERENCES

1. Armstrong M.: Zarządzanie zasobami ludzkimi, ABC, Kraków 2003 r.
2. Baron A., Armstrong M.: Zarządzanie kapitałem ludzkim. Uzyskiwanie wartości dodanej dzięki ludziom, Wolters Kluwer, Kraków 2008 r.
3. Bochniarz P., Gugąła K.: Budowanie i pomiar kapitału ludzkiego w firmie, Wydawnictwo Poltext, Warszawa 2005 r.
4. Gorczycka E.: Wybrane problemy zarządzania kapitałem ludzkim, Wydawnictwo Politechniki Częstochowskiej, Częstochowa 2008 r.
5. Juchnowicz M.: Elastyczne zarządzanie kapitałem ludzkim w organizacji wiedzy, Centrum Doradztwa i Informacji Difin, Warszawa 2007 r.
6. Król H., Ludwicyński A.: Zarządzanie zasobami ludzkimi. Tworzenie kapitału ludzkiego organizacji, Wydawnictwo Naukowe PWN, Warszawa 2006 r.
7. Poczowski A.: W kierunku jakości kapitału ludzkiego, Instytut Pracy i Spraw Socjalnych, Warszawa 2007 r.
8. Stoner J. A. F., Freeman R. E., Gilbert D. R.: Kierowanie, PWE, Warszawa 2001 r.
9. Trompenaars F., Hampden-Turner Ch.: Siedem wymiarów kultury. Znaczenie różnic kulturowych w działalności gospodarczej, Oficyna Ekonomiczna, Kraków 2002 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. Griffin R.W.: Podstawy zarządzania organizacjami, Wydawnictwo Naukowe PWN, Warszawa 2006 r.
2. Drucker P. F.: Zarządzanie w XXI wieku, Muza SA, Warszawa 2000 r.
3. Prusak R.: Kształtowanie struktury kapitału intelektualnego przedsiębiorstwa, Politechnika Częstochowska, Prace Naukowe Wydziału Inżynierii Procesowej, Materiałowej i Fizyki Stosowanej, Seria: Monografie Nr 34, Częstochowa 2013 r.

LEARNING OUTCOMES

- › **EU1** The student has theoretical knowledge of the factors influencing the effectiveness of management in the enterprise and knows the basic management functions, their roles and importance for the correct implementation of strategic goals in the enterprise.
- › **EU2** The student has knowledge of staff formation as well as methods and techniques of human resources development.
- › **EU3** The student has basic knowledge of the psychological determinants of human behavior in the enterprise and knows the basic methods of personality analysis of management staff and is able to use them in practice.

TEACHING TOOLS

- › Multimedia presentations.
- › Manuals, scripts.
- › Laboratory equipment and guides.
- › CUT e-learning platform (possible use).

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

- › **F1.** Assessment of knowledge in the field of basic concepts in the field of organization and business management.
- › **F2.** Assessment of self-preparation of exercises.
- › **P1.** 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	2	0,08
Exam		

Total contact hours	32	1,28
Student's own work		
Getting acquainted with the indicated literature	5	0,2
Preparation for seminar		
Preparation for classes	5	0,2
Preparation for lab		
Project preparation		
Consultation	2	0,08
Preparation for the test	6	0,24
Total student's own work	18	0,72
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_W07, K_U07, K_K02,	C2, C4	L1 - L15 C1 - C15	F1, F2 P1
EU 2	K_W07, K_U07, K_K02,	C2, C3, C4	L4 - L7 C4, C7, C8, C10, C15	F1, F2 P1
EU 3	K_W07, K_U07,	C1, C2	L3 - L15 C11 - C15	F1, F2 P1

	K_K02,			
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FORM OF ASSESSMENT - DETAILS

EU1 The student has theoretical knowledge of the factors influencing the effectiveness of management in the enterprise and knows the basic managerial functions, their roles and importance for the correct implementation of strategic goals in the enterprise.

- › 2,0 The student does not have theoretical knowledge of the factors influencing the effectiveness of management in the enterprise and does not know the basic management functions, their role and importance for the correct implementation of strategic goals in the enterprise.
- › 3,0 The student has theoretical knowledge of the factors influencing the effectiveness of management in the enterprise and knows the basic management functions, their roles and importance for the correct implementation of strategic goals in the enterprise to a satisfactory degree.
- › 3,5 The student has theoretical knowledge of the factors influencing the effectiveness of management in the enterprise and knows the basic management functions, their roles and importance for the correct implementation of strategic goals in the enterprise to a satisfactory plus degree.
- › 4,0 The student has theoretical knowledge of the factors influencing the effectiveness of management in the enterprise and knows the basic management functions, their roles and importance for the correct implementation of strategic goals in the enterprise to a good degree.
- › 4,5 The student has theoretical knowledge of the factors influencing the effectiveness of management in the enterprise and knows the basic management functions, their roles and importance for the correct implementation of strategic goals in the enterprise to a good plus degree.
- › 5,0 The student has theoretical knowledge of the factors influencing the effectiveness of management in the enterprise and knows the basic management functions, their roles and importance for the correct implementation of strategic goals in the enterprise to a very good degree.

EU2 The student has knowledge of staff formation as well as methods and techniques of human resources development.

- › 2,0 The student has no knowledge of staff formation as well as methods and techniques of human resources development.

- › 3,0 The student has knowledge of staff formation and methods and techniques of human resources development to a satisfactory degree.
- › 3,5 The student has knowledge of staff formation and methods and techniques of human resources development to a satisfactory plus degree.
- › 4,0 The student has a good knowledge of staff formation and methods and techniques of human resources development.
- › 4,5 The student has knowledge of the staff formation and methods and techniques of human resources development to a good plus degree.
- › 5,0 The student has a very good knowledge of staff formation as well as methods and techniques of human resources development.

EU 3 The student has basic knowledge of the psychological determinants of human behavior in the enterprise and knows the basic methods of personality analysis of managerial staff and is able to use them in practice.

- › 2,0 The student does not have basic knowledge of psychological determinants of human behavior in the enterprise and does not know the basic methods of personality analysis of managerial staff and is not able to use them in practice.
- › 3,0 The student has basic knowledge of the psychological determinants of people's behavior in the enterprise and knows the basic methods of personality analysis of managerial staff and is able to use them in practice to a satisfactory degree.
- › 3,5 The student has basic knowledge of the psychological determinants of human behavior in the enterprise and knows the basic methods of personality analysis of managerial staff and is able to use them in practice to a satisfactory plus degree.
- › 4,0 The student has basic knowledge of the psychological determinants of human behavior in the enterprise and knows the basic methods of personality analysis of managerial staff and is able to use them in practice to a good degree.
- › 4,5 The student has basic knowledge of the psychological determinants of human behavior in the enterprise and knows the basic methods of personality analysis of management staff and is able to use them in practice to a good plus degree.
- › 5,0 The student has basic knowledge of the psychological determinants of human behavior in the enterprise and knows the basic methods of personality

analysis of the managerial staff and is able to use them in practice to a very good degree.

Polish course name	PRAKTYKA ZAWODOWA
English course name	ENGINEERING PRACTICE
Course code	WIP-MDL-D1-EP-04
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	4
Number of ECTS points	4
Ways of assessment	Test

Number of hours per semester - 100 h

TEACHERS:

Dr hab. inż. Grzegorz Golański, prof. PCz.

COURSE OBJECTIVES:

- › **C1** Verification of theoretical knowledge with its practical use in the field of the subject matter realized in the company.
- › **C2** The acquisition of practical skills by students in the field of design and logistics of engineering materials in industrial conditions.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. The basic knowledge in the scope of materials engineering, the knowledge of manufacturing, processing, and logistics of engineering materials.
2. Ability to work both independently and in a team.
3. Ability to use scientific literature and web resources.

COURSE CONTENT

1. The Occupational Health and Safety training specified in the workplace regulations.
2. Fulfillment of the internship curriculum content under the guidance of the company's internship supervisor.

LEARNING OUTCOMES

- › **EU1** The student can verify their knowledge acquired during studies with the actual requirements of the company.
- › **EU2** The student has knowledge and skills to perform tasks assigned during the internship.

TEACHING TOOLS

- › Devices, equipment, and software of the company.

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

- › **F1.** Evaluation of the internship supervisor with the grade noted in the Internship Journal.
- › **P1.** Evaluation of the internship completion given by the Dean's Representative on Internship.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Student's own work at placement site	100	4,0
Total number of hours/ ECTS points for the course	100	4,0

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_W03÷K_W06, K_U04÷K_U07,	C1, C2	CC1 - CC2	F1, P1

	K_K01÷K_K04,			
EU 2	K_W03÷K_W06, K_U04÷K_U07, K_K01÷K_K04,	C2, C2	CC1 - CC2	F1, P1

FORM OF ASSESSMENT - DETAILS

EU1 The student can verify their knowledge acquired during studies with the actual requirements of the company.

- › 2,0 The student is not able to verify their theoretical knowledge with its practical use in the field of the subject matter realized in the company.
- › 3,0 The student is partially able to verify their theoretical knowledge with its practical use in the field of the subject matter realized in the company.
- › 3,5 The student is nearly able to verify their theoretical knowledge with its practical use in the field of the subject matter realized in the company.
- › 4,0 The student is able to well verify their theoretical knowledge with its practical use in the field of the subject matter realized in the company.
- › 4,5 The student is able to almost very well verify their theoretical knowledge with its practical use in the field of the subject matter realized in the company.
- › 5,0 The student is able to very well verify their theoretical knowledge with its practical use in the field of the subject matter realized in the company.

EU2 The student has knowledge and skills to perform tasks assigned during the internship.

- › 2,0 The student did not acquire practical skills in the field of design and logistics of engineering materials in industrial conditions.
- › 3,0 The student partially acquired practical skills in the field of design and logistics of engineering materials in industrial conditions.
- › 3,5 The student nearly acquired practical skills in the field of design and logistics of engineering materials in industrial conditions.
- › 4,0 The student acquired practical skills in the field of design and logistics of engineering materials in industrial conditions at a good level.
- › 4,5 The student acquired practical skills in the field of design and logistics of engineering materials in industrial conditions at almost a very good level

- › 5,0 The student acquired practical skills in the field of design and logistics of engineering materials in industrial conditions at a very good level.

Polish course name	ZARZĄDZANIE ZASOBAMI PRZEDSIĘBIORSTWA
English course name	ENTERPRISE RESOURCE MANAGEMENT
Course code	WIP-MDL-D1-ERM-05
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	5
Number of ECTS points	3
Ways of assessment	Test

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15		15		15

TEACHERS:

Dr hab. inż. Rafał Prusak, prof. PCz.,

Dr inż. Ewa Staniewska,

Dr inż. Monika Górka.

COURSE OBJECTIVES:

- › **C1** To provide students with knowledge about the importance of integrated enterprise resource management.
- › **C2** Acquiring practical skills by students in carrying out analyzes of the company's resources and its competitive potential.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Basic knowledge of economics in terms of the concepts of the market and market economy.
2. Ability to work independently and in a group.
3. Ability to use literature sources and internet resources.

COURSE CONTENT

LECTURE

- › **L1 - L3** Introduction to the subject of resources, enterprise resource management, resource theory of organization. The theory of resources and competences, resource approach to enterprise strategy.
- › **L 4 - L7** Human and material resources, financial.
- › **L 8** Information and knowledge resources.
- › **L 9, L10** Intangible resources: market, relational and organizational.
- › **L 11, L12** Criteria and methods of resource assessment.
- › **L 13** Resources in creating enterprise competitiveness.
- › **L 14** Improving the structure of resources.
- › **L 15** Completion of the course.

CLASSES

- › **C1, C2** Quantitative and qualitative analysis and optimization of the company's human resources.
- › **C3 - C5** Research on organizational resources.
- › **C6, C7** Analysis of the company's knowledge resources. Streamlining the processes of creating and disseminating knowledge.
- › **C8 - C10** Main indicators of the economic analysis of the enterprise.
- › **C11** Assessment of resources using the VRIO model.
- › **C12** Identifying the strengths and weaknesses of the company by making a strategic balance sheet.
- › **C13, C14** Capacity planning.
- › **C15** Completion of the course.

PROJECT

- › **P1 - P3** Strategic balance of the enterprise.
- › **P4, P5** Research on organizational resources.
- › **P6, P7** Analysis of the company's human resources.
- › **P8, P9** Financial analysis.
- › **P10** Assessment of resources using the VRIO model.
- › **P11** Capacity Requirement Planning.

- › **P12** Application of methods of research and development of enterprise knowledge resources.
- › **P13 - P15** Presentation of the project.

BASIC REFERENCES

1. J. Ashok: Zarządzanie wiedzą, zintegrowane podejście, Polskie Wydawnictwo Ekonomiczne, Warszawa 2006 r.
2. I. Nonaka, H. Takeuchi: Kreowanie wiedzy w organizacji, Poltext, Warszawa 2000 r.
3. Z. Głodek: Zarządzanie finansami przedsiębiorstw, Polskie Wydawnictwo Ekonomiczne, Warszawa 2004 r.
4. R.M. Grant: Współczesna analiza strategii, Oficyna Wolters Kluwer business, Warszawa 2011 r.
5. R.S. Kaplan, D.P. Norton: Wdrażanie strategii dla osiągnięcia przewagi konkurencyjnej, Wydawnictwa Profesjonalne PWN, Warszawa 2010 r.
6. E. Michalski: Zarządzanie przedsiębiorstwem, Wydawnictwo Naukowe PWN, Warszawa 2022 r.
7. M. Porter: Pięć sił konkurencyjnych kształtujących strategię, Harvard Business Review Polska, Lipiec-Sierpień 2008 r.
8. R.E. Hall, J.B. Taylor: Makroekonomia: Teoria funkcjonowania i polityka, Wydawnictwo Naukowe PWN, Warszawa 2015 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. R.W. Griffin: Podstawy zarządzania organizacjami, Wydawnictwo Naukowe PWN, Warszawa 2006 r.
2. P.F. Drucker: Zarządzanie w XXI wieku, Wydawnictwo Muza SA, Warszawa 2000 r.

LEARNING OUTCOMES

- › **EU1** The student has knowledge of the integrated resource management of the enterprise.
- › **EU2** The student has knowledge of the negotiation process and rules of its conduct.

TEACHING TOOLS

- › Lecture with the use of audiovisual aids.
- › Case descriptions to be analyzed during the classes.
- › PCz e-learning platform.

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

- › **F1.** Assessment of self-preparation for exercises.
- › **P1.** Final 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	15	0,6
Test	3	0,12
Exam		
Total contact hours	48	1,92
Student's own work		
Getting acquainted with the indicated literature	5	0,2
Preparation for seminar		
Preparation for classes	5	0,2
Preparation for lab		
Project preparation	10	0,4
Consultation	2	0,08
Preparation for the test	5	0,2
Total student's own work	27	1,08
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_W07, K_U04, K_U07, K_K01,	C1	L1 - L15	P1
EU 2	K_W07, K_U06, K_K01,	C2	C1 - C15 P1 - P15	F1

FORM OF ASSESSMENT - DETAILS

EU1 The student has knowledge of the integrated resource management of the enterprise.

- › 2,0 The student does not have basic knowledge of the integrated resource management of the enterprise.
- › 3,0 The student has a basic knowledge of integrated enterprise resource management.
- › 3,5 The student has a basic knowledge of the integrated resource management of the enterprise to a sufficiently plus degree
- › 4,0 The student has knowledge of enterprise resource management.
- › 4,5 The student has mastered the basic knowledge of the integrated resource management of the enterprise to a good plus degree
- › 5,0 The student has a significant knowledge of the integrated resource management of the enterprise.

EU2 The student is able to carry out a practical analysis of the company's resources and its competitive potential.

- › 2,0 The student is not able to analyze the company's resources and its competitive potential.
- › 3,0 The student is able to partially analyze the company's resources and its competitive potential.
- › 3,5 The student is able to do a sufficiently plus to analyze the company's resources and its competitive potential.
- › 4,0 The student is able to analyze the company's resources and its competitive potential.
- › 4,5 The student is able to analyze the company's resources and its competitive potential to a good plus degree
- › 5,0 The student is able to very well analyze the company's resources and its competitive potential.

Polish course name	PROJEKTOWANIE PRODUKTU
English course name	PRODUCT DESIGN
Course code	WIP-MDL-D1-PD-05
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	5
Number of ECTS points	4
Ways of assessment	Test

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15				30

TEACHERS:

Dr inż. Cezary Kolmasiak,

Dr inż. Zbigniew Skuza,

Dr inż. Marzena Ogórek.

COURSE OBJECTIVES:

- › **C1** Provide the student with the necessary engineering knowledge to design a new product.
- › **C2** Providing the student with the necessary knowledge and skills to introduce the product to the market.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Knowledge of the basic elements in the field of production management.
2. Ability to work independently and in a group.
3. Ability to work on a computer with a typical Windows operating system.
4. Ability to use literature sources and internet resources.

COURSE CONTENT

LECTURE

- › **L1** The concept and structure of the product.
- › **L2** Classification of products. Product life cycle. product life cycle costs and income.
- › **L3** Strategies of entry and exit. Criteria for forming the range of products.
- › **L4** Introduction to rapid prototyping methods.
- › **L5** Packaging and its importance in product design.
- › **L6** Factors effectively affecting a potential customer (color, shape, size, material, text, illustrations).
- › **L7** Market analysis. Product planning.
- › **L8** Stages in product development. Generating ideas. Initial selection of ideas.
- › **L9** Materials. Selection of materials.
- › **L10** Production processes.
- › **L11** Preliminary study design and tests.
- › **L12, L13** Marketing and economic analyzes.
- › **L14, L15** Product launch. Compare products.

Project

- › **P1** Introduction to design activities.
- › **P2** Product life cycle. Product Life Cycle Costs and Income.
- › **P3, P4** A comparative analysis of several products of the same purpose.
- › **P5, P6** Changes to an existing product - redesign of an existing product in order to improve its functional, visual and design properties.
- › **P7, P8** Identification and selection based on market analysis of a design product. Comparison of products available on the market.
- › **P9** Stages in product development. Generating ideas. Initial selection of ideas.
- › **P10 - P12** Properties and determination of material resources for the selected product.
- › **P13 - P16** Materials. A proposal for the selection of materials, taking into account the processing technology. Preliminary design of the study and tests.
- › **P17 - P20** Selection of the production process.
- › **P21, P22** Marketing and economic analyzes.
- › **P23, P24** Methods and techniques of product quality assessment.

- › **P25 - P27** Packaging and its importance in product design.
- › **P28** Factors that effectively affect a potential customer (color, shape, size, material, text, illustrations).
- › **P29, P30** Development of the concept and definition of the functions of the packaging of the designed product.

BASIC REFERENCES

1. P. Sparke, Design Historia wzornictwa, Arkady Warszawa 2012 r.
2. J. Jabłoński, Ergonomia produktu. Ergonomiczne zasady projektowania produktów, Wydawnictwo Politechniki Poznańskiej, Poznań 2006 r.
3. R. Knosala, Inżynieria Produkcji Kompendium Wiedzy, Polskie Wydawnictwo Ekonomiczne, Warszawa 2017 r.
4. I. Durlik, Strategia i projektowanie systemów produkcyjnych. AW Placet. Gdańsk 1996 r.
5. R. Morris, Projektowanie produktu, PWN, Warszawa 2009 r.
6. Praca zbiorowa, Komunikacja wizualna, Wydawnictwa naukowe SCHOLAR, Warszawa 2012 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. Praca zbiorowa, O wzornictwie przemysłowym, definicje, procedury, korzyści; opracowanie ASP, Warszawa 2010 r.
2. L. Slack, Czym jest Wzornictwo? Podręcznik projektowania, Dom wydawniczy 2007 r.

LEARNING OUTCOMES

- › **EU1** The student has knowledge of product classification and the stages of developing new products.
- › **EU2** The student has knowledge of the selection of materials and product manufacturing processes.

TEACHING TOOLS

- › Lecture with the use of audiovisual aids.
- › Project - solving problem tasks with the help of the teacher.

- › E-learning platform of the Częstochowa University of Technology or other distance learning tools.
- › Computer software: Corel Draw.

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

- › **F1.** Assessment of own work during laboratory exercises.
- › **F2.** Assessment of the ability to apply the acquired knowledge while performing tasks.
- › **P1.** Preparation of the design of a new product.
- › **P2.** Preparation of the design and model of the product packaging.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures	15	0,6
Seminar		
Classes		
Laboratory		
Project	30	1,2
Test		
Exam	2	0,08
Total contact hours	47	1,88
Student's own work		
Getting acquainted with the indicated literature	10	0,4
Preparation for seminar		
Preparation for classes		
Preparation for lab		
Project preparation	33	1,32
Consultation	4	0,16
Preparation for the test	6	0,24
Total student's own work	53	2,12
Total number of hours/ ECTS points for the course	100	4,0

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_W02, K_W03, K_W04, K_W07, K_U04, K_U06, K_K03,	C1, C2	L1 - L15, P1 - P30	F1, F2, P1, P2
EU 2	K_W02, K_W03, K_W04, K_U04, K_U06, K_K03,	C1, C2	L1 - L15, P1 - P30	F1, F2, P1, P2

FORM OF ASSESSMENT - DETAILS

EU1 The student has knowledge of the classification of products and the stages of developing new products.

- › 2,0 The student has no knowledge of product classification and the stages of developing new products.
- › 3,0 The student has a basic knowledge of the classification of products and the stages of developing new products to a sufficient degree.
- › 3,5 The student has a basic knowledge of the classification of products and the stages of developing new products sufficiently plus.
- › 4,0 The student has a good knowledge of the classification of products and the stages of developing new products.
- › 4,5 The student has a good knowledge of the classification of products and the stages of developing new products.

- › 5,0 The student has a very good knowledge of the classification of products and the stages of developing new products.

EU2 The student has knowledge of the selection of materials and product manufacturing processes.

- › 2,0 The student has no knowledge of the selection of materials and product manufacturing processes.
- › 3,0 The student has a basic knowledge of the selection of materials and sufficient product manufacturing processes.
- › 3,5 The student has a basic knowledge of the selection of materials and the production processes of products sufficiently plus.
- › 4,0 The student has a good knowledge of the selection of materials and the processes of producing products.
- › 4,5 The student has a good knowledge of the selection of materials and product manufacturing processes to a positive degree.
- › 5,0 The student has a very good knowledge of the selection of materials and the manufacturing processes of products.

Polish course name	LOGISTYKA DYSTRYBUCJI
English course name	LOGISTICS OF DISTRIBUTION
Course code	WIP-MDL-D1-LOD-05
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	5
Number of ECTS points	3
Ways of assessment	Exam

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15		15		

TEACHERS:

Dr inż. Monika Kozerska,

Dr Anna Budzik.

COURSE OBJECTIVES:

- › **C1** Structured teaching of practical knowledge about the principles and concepts of distribution logistics and their framework conditions in modern companies.
- › **C2** Fundamental topics from the field of modern trends in the computerization of logistics processes.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Basic general knowledge of logistics. Basic knowledge in the field of distribution logistics.
2. The ability to work independently and in a group.
3. Knowledge in dealing with literature sources and online resources.

COURSE CONTENT

LECTURE

- › **L1** General theory of the basics of logistics, extraction of the distribution logistics subsystem and classification in the supply chain.
- › **L2** Subject matter and scope and characteristics of distribution logistics.
- › **L3, L4** Total logistics costs with a list of all costs related to distribution logistics.
- › **L5, L6** Nature and structure of sales channels.
- › **L7** Design sales channels.
- › **L8** Interactions and conflicts in the sales channels.
- › **L9** prices and their design in the distribution channels.
- › **L10** Marketing tools in distribution logistics.
- › **L11** Distribution policy: sales method, commercial services, delivery service.
- › **L12** Characteristics of wholesale and retail trade.
- › **L13, L14** Communication policy: advertising, public relations, sales promotion, direct sales.
- › **L15** Logistics management for goods distribution processes.

CLASSES

- › **C1, C2** Introductory lesson: Organizational part, presentation of the purpose of the course, definition of the requirements, distribution of the tasks to be performed by the students, definition of the rules for their implementation, clarification of the rules for the execution of the library request. Introduction to the subject - Defining basic terms and concepts.
- › **C3 - C6** Use of word-based activation teaching methods Work with the book, solve tasks and discuss how distribution logistics works.
- › **C7 - C12** Presentation of the results of the realized questions in the field of distribution logistics.
- › **C13 - C15** Explanation of the conclusions proposed by the tutor on the issues of distribution logistics.

BASIC REFERENCES

1. Pisz I., Sęk T., Zielecki T., Logistyka w przedsiębiorstwie, Wyd. PWE, Warszawa 2013 r.
2. Biesok G., Logistyka usług, Wyd. CeDeWu, Warszawa 2013 r.
3. Skowronek C., Sarjusz-Wolski Z., Logistyka w przedsiębiorstwie, Wyd. PWE, Warszawa 2012 r.

4. Kozerska M., Smolnik P., Rola dystrybucji w przedsiębiorstwie na przykładzie firmy Hygienka SA, Logistyka nr 3 2012 (wersja online, dostęp: <https://www.czasopismologistyka.pl/artykuly-naukowe/send/239-artykuly-na-plycie-cd/2625-artykul>).

SUPPLEMENTARY REFERENCE MATERIALS

1. Szymonik A., Chudzik D., Logistyka nowoczesnej gospodarki magazynowej, Wyd. Difin, Warszawa 2017 r.
2. Kozerska, M., Outsourcing usług logistycznych w Polsce. Logistyka, (3)/2014, s. 3193-3199.
3. Kozerska, M., Dystrybucja ładunków masowych z wykorzystaniem transportu kolejowego-przykład firmy X. Logistyka, (6)/2014, s. 5903-5913.
4. Kozerska M., Analiza skuteczności i jakości dostarczania przesyłek na przykładzie firmy kurierskiej X. Zeszyty Naukowe. Organizacja i Zarządzanie/Politechnika Śląska 2016 r.
5. Czasopisma branżowe: „Logistyka”, „Eurologistics”, „Logistyka a jakość”, „Logistyka Transport Spedycja”, „Gospodarka magazynowa i logistyka”, „Gazeta transportowa”, „Nowoczesny Magazyn” i inne.

LEARNING OUTCOMES

- › **EU1** Student acquires knowledge and skills to understand and use sales systems in the company.
- › **EU2** Student is familiar with technical and economic aspects of distribution logistics.
- › **EU3** Student understands the essence of distribution logistics as knowledge about planning, controlling and monitoring the processes that take place in this system.

TEACHING TOOLS

- › Lecture with audiovisual means.
- › Multimedia presentations.
- › The study of literature.
- › Case studies.

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

- › F1. Participation of students in discussions.
- › P1. Checking the knowledge from the exercise.
- › P2. Assessment of mastery of teaching material in the context of lectures – 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	7	0,28
Total contact hours	37	1,48
Student's own work		
Getting acquainted with the indicated literature	12	0,48
Preparation for seminar		0
Preparation for classes	12	0,48
Preparation for lab		0
Project preparation		0
Consultation	4	0,16
Preparation for the exam	10	0,4
Total student's own work	38	1,52
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
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Information about the consultation (time + place)	https://wip.pcz.pl/dla-studentow/konsultacje-dla-studentow
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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, P1
EU 2	K_W01, K_W02, K_W06, K_W07, K_W08, K_W09, K_K01,	C1, C2	L1 - L9, C3 - C6	F1, P1,
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, P1, P2

FORM OF ASSESSMENT - DETAILS

EU1 Student acquires knowledge and skills to understand and use sales systems in the company.

- › 2,0 Student does not know the basic concepts of distribution logistics.
- › 3,0 Student is partly familiar with the basic concepts of distribution logistics.
- › 3,5 Student almost knows the basic rules of logistics.
- › 4,0 Student is very familiar with the conceptual apparatus of distribution logistics.
- › 4,5 Student masters the conceptual apparatus of distribution logistics almost very well.

- › 5,0 Student understands the fluent handling of concepts from distribution logistics.

EU2 Student is familiar with technical and economic aspects of distribution logistics.

- › 2,0 Student does not have technical and economic knowledge in the different areas of distribution logistics.
- › 3,0 Student is partly familiar with selected technical and economic topics from different areas of distribution logistics
- › 3,5 Student can practically apply the conceptual apparatus of technical and economic questions in the different areas of distribution logistics.
- › 4,0 Student is well acquainted with the conceptual apparatus of technical and economic issues in the different areas of distribution logistics.
- › 4,5 Student has a good grasp of the conceptual apparatus of technical and economic questions in the different areas of distribution logistics.
- › 5,0 Student is fluent in the conceptual apparatus of technical and economic questions of distribution logistics.

EU 3 Student understands the essence of distribution logistics as knowledge about planning, controlling and monitoring the processes that take place in this system.

- › 2,0 Student does not understand the nature of distribution logistics as planning knowledge, control and monitoring of the processes running in this system.
- › 3,0 Student partially understands selected aspects of logistics sales as knowledge about planning, controlling and monitoring of processes in this system of processes.
- › 3,5 Student understands selected aspects of logistics almost well sales as knowledge about planning, controlling and monitoring of processes in this system of processes.
- › 4,0 Student knows all aspects of distribution logistics as knowledge of the planning, control and monitoring of the work carried out in this system processes.
- › 4,5 Student is almost familiar with all aspects of distribution logistics as knowledge for planning, controlling and monitoring the processes running in this system.

- › 5,0 Student is familiar with all aspects of distribution logistics as knowledge of planning, controlling and monitoring the processes running in this system and is able to show the differences between them.

Course name in Polish	JĘZYK OBCY (ANGIELSKI)
Course name in English	FOREIGN LANGUAGE (ENGLISH)
Course code	WIP-MDL-D1-FL-05
Field of study	Materials design and logistics
Level of qualification	First cycle degree programme
Form of study	Full-time
Semester	5
ECTS	2
Method of assessment	End-of-semester assessment

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
		30		

TEACHERS:

Katarzyna Stefańczyk, MA
Wioletta Będkowska, MA
Joanna Dziurkowska, MA
Małgorzata Engelking, MA
Marian Gałkowski, MA
Aleksandra Glińska, MA
Katarzyna Górniak-Cierpień, MA
Dorota Imiołczyk, MA
Aneta Kot, MA
Izabela Mishchil, MA
Monika Nitkiewicz, MA
Barbara Nowak, MA
Joanna Pabjańczyk-Musialska, MA
Dominika Rachwalik, MA
Przemysław Załęcki, MA

COURSE OBJECTIVES:

- › **C1** Practising and developing the basic language skills (listening, speaking, reading, writing) necessary to function in an international working environment and in everyday life.
- › **C2** Learning the necessary general and specialised vocabulary related to the field of study.
- › **C3** Acquiring intercultural knowledge and skills.

REQUIRED KNOWLEDGE, SKILLS, COMPETENCES:

1. Command of a foreign language at the B1 level according to CEFR (the Common European Framework of Reference for Languages).
2. Ability to work independently and in a group.
3. Ability to use various sources of information, also in a foreign language.

COURSE CONTENT

CLASSES

- › **C1, C2** Lexical-grammatical structures.
 - › **C3, C4** Language structures in use: word formation.
 - › **C5, C6** PLW* - Work skills: telephoning.
 - › **C7, C8** Functions: giving advice and suggestions. Language structures in use.
 - › **C9, C10** PLW* Job satisfaction- lexical exercises, conversations.
 - › **C11, C12** Specialised text.**
 - › **C13, C14** Revision.
 - › **C15, C16** Achievement test I.
 - › **C17, C18** Language structures in use – Technological innovations. Audiovisual coursework.
 - › **C19, C20** PLW* - professional life challenges – lexical exercises, conversations. Presentation elements.
 - › **C21, C22** PLW* - modern telecommunications solutions for business.
 - › **C23, C24** Functions: new technologies at work. Problems and solutions.
 - › **C25, C26** Specialised text.** Revision.
 - › **C27, C28** Achievement test II.
 - › **C29, C30** Review. Individual student presentations.
- *) PLW - Professional Language in the Workplace.

***)Topics of specialised texts closely related to the characteristics and scope of the field of study.

RESOURCE MATERIALS

LITERATURA

1. K. Harding, L. Taylor: International Express – Intermediate, OUP 2019 r.
2. K. Harding, L. Taylor: International Express - Upper- Intermediate, OUP 2019 r.
3. D. Cotton; D. Falvey, S. Kent: Market Leader - Upper-Intermediate, Pearson 2016 r.
4. J. Kern: Career Paths - Mechanical Engineering, Express Publishing 2016 r.
5. I. Dubicka, M. O’Keeffe i inni: B1+ Business Partner, Pearson 2018 r.
6. M. Ibbotson: Engineering, Technical English for Professionals CUP 2021 r.
7. I. Dubicka, M. Rosenberg i inni: B2 Business Partner, Pearson 2018 r.
8. D.Bonamy: Technical English 3/ 4, Pearson 2013 r.

SUPPLMENTARY RESOURCE MATERIALS

1. V. Hollet, J. Sydes: Tech Talk OUP 2011 r.
2. I. Williams: English for Science and Engineering, Thomson LTD 2001 r.
3. N. Briger, A. Pohl: Technical English Vocabulary and Grammar, Summertown Publishing 2002 r.
4. V. Evans, J. Dooley, K. Rodgers: Career Paths: Natural Resources II – Mining, Egis 2018 r.
5. M. Ibbotson: Cambridge English for Engineering, CUP 2021 r.
6. C. Lloyd, J. A. Frazier: Career Paths – Engineering, Express Publishing 2018 r.
7. Aplikacje specjalistyczne: Mechanical Engineering.
8. E. J. Williams: Presentations in English, Macmillan 2008 r.
9. J. Dooley, V. Evans: Grammarway 2,3,4; Express Publishing 1999 oraz inne podręczniki do gramatyki.
10. Dictionary of Contemporary English, Pearson Longman 2009 oraz inne słowniki.
11. M. Duckworth, J. Hughes: Business Result - Upper-Intermediate, OUP 2018 r.
12. S. Sopranzi: Flash on English for Mechanics, Electronics and Technical Assistance, Eli 2016 r.

LEARNING OUTCOMES

- › **EU1** The student is able to use a foreign language to the extent necessary to function in a professional environment and typical everyday life situations.
- › **EU2** The student is able to read and understand a popular science text related to his/her field of study.
- › **EU3** The student is able to prepare and deliver a presentation in a foreign language using multimedia.

TEACHING TOOLS

- › General and specialised language textbooks.
- › Purpose built exercises.
- › Audiovisual exercises, multimedia presentations.
- › Internet resources, CUT e-learning platform.
- › Professional dictionaries and online dictionaries.

METHOD OF ASSESSMENT (F- FORMATIVE, S- SUMMATIVE)

- › **F1.** Grade for class preparation.
- › **F2.** Grade for class participation.
- › **F3.** Grade for the achievement test.
- › **F4.** Grade for the presentation.
- › **F5.** Grade for assignments completed in e-learning mode.
- › **P1.** End-of-semester grade*.

*) a prerequisite for obtaining an end-of-semester grade is receiving passing grades in all assignments and achievement tests.

STUDENT WORKLOAD

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

Projects		
End-of-semester assessment		
Examination		
Total direct contact classes	30	1,2
Student's unassisted work		
Self-directed study of lectures		
Self-directed preparation for seminars		
Self-directed preparation for tutorials	8	0,32
Self-directed preparation for laboratories		
Self-directed preparation for projects		
Consultations	2	0,08
Preparation for the end-of-semester assessment/examination	10	0,4
Total student's unassisted work	20	0,8
Total student workload	50	2,0

SUPPLEMENTARY INFORMATION

Class times	Information on class times is available at the Office of the Centre for Foreign Languages and in USOS. Foreign language classes are held at the Centre for Foreign Languages at Czestochowa University of Technology, ul. Dąbrowskiego 69 as well as Moodle e-learning platform of Czestochowa University of Technology is used.
Consultation times	Information on consultations is provided to students during the first class of a given course, and is also placed on the website of the Centre for Foreign Languages - www.sjo.pcz.pl

MATRIX OF LEARNING OUTCOMES

Learning outcome	Reference of the given outcome to outcomes defined	Course objectives	Course content	Method of assessment
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	for the entire programme			
EU1	K_W09, K_U01, K_U09, K_K04,	C1, C2, C3	C1 - C30	F1, F2, F3, F5, P1
EU2	K_W09, K_U01, K_U09, K_K04,	C1, C2, C3	C11 - C12, C25 - C26	F2, F5, P1
EU3	K_W09, K_U01, K_U09, K_K04,	C1, C2, C3	C17 - C20, C29 - C30	F1, F4, F5

LEARNING OUTCOMES EVALUATION MATRIX

EU1 The student is able to use a foreign language to the extent necessary to function in a professional environment and typical everyday life situations.

- › 2,0 The student is not able to use a foreign language and use appropriate grammatical and lexical structures in a professional environment and typical everyday life situations in both written and oral form. The student's score in the achievement test is below 60%.
- › 3,0 The student is able to use the foreign language to a very limited extent, making numerous mistakes. The student scores between 60-75% in the test.
- › 3,5 A grade of 3,5 is given when the learning outcomes for a grade of 3,0 have been fully achieved, but the student has not fully acquired the learning outcomes for a grade of 4,0.
- › 4,0 The student is able to use the foreign language correctly but occasionally makes mistakes. The student scores between 80-85% in the test.
- › 4,5 A grade of 4,5 is given when the learning outcomes for a grade of 4,0 have been fully achieved, but the student has not fully acquired the learning outcomes for a grade of 5,0.
- › 5,0 The student is able to express himself/herself fluently and spontaneously on professional and social topics and in social interactions. The student's score in the achievement test is above 91%.

EU2 The student is able to read and understand a popular science text related to his/her field of study.

- › 2,0 The student is not able to understand a popular science text he/she reads. The student's score in the reading comprehension test is below 60%.
- › 3,0 The student understands only excerpts from the text he/she reads and has difficulty interpreting it. The student scores between 60-75% in the reading comprehension test.
- › 3,5 A grade of 3,5 is given when the learning outcomes for a grade of 3,0 have been fully achieved, but the student has not fully acquired the learning outcomes for a grade of 4,0.
- › 4,0 The student understands the meaning of the main topics of the text and is able to interpret them. The student scores between 80-85% in the reading comprehension test.
- › 4,5 A grade of 4,5 is given when the learning outcomes for a grade of 4,0 have been fully achieved, but the student has not fully acquired the learning outcomes for a grade of 5,0.
- › 5,0 The student understands everything he/she reads, including details. He/she is able to accurately interpret the text in his/her own words. The student's score in the reading comprehension test is above 91%.

EU 3 The student is able to prepare and deliver a presentation in a foreign language using multimedia.

- › 2,0 The student is not able to prepare and deliver a presentation on a given topic.
- › 3,0 The student is able to prepare a presentation according to the established standards and deliver it but makes numerous language mistakes.
- › 3,5 A grade of 3,5 is given when the learning outcomes for a grade of 3,0 have been fully achieved, but the student has not fully acquired the learning outcomes for a grade of 4,0.
- › 4,0 The student is able to prepare a presentation according to the established standards and deliver it in a clear and communicative manner.
- › 4,5 A grade of 4,5 is given when the learning outcomes for a grade of 4,0 have been fully achieved, but the student has not fully acquired the learning outcomes for a grade of 5,0.

- › 5,0 The student is able to prepare a presentation according to the established standards and deliver it using rich lexis and advanced language and grammatical structures.

Course name in Polish	JĘZYK OBCY (NIEMIECKI)
Course name in English	FOREIGN LANGUAGE (GERMAN)
Course code	WIP-MDL-D1-FL-05
Field of study	Materials design and logistics
Level of qualification	First cycle degree programme
Form of study	Full-time
Semester	5
ECTS	2
Method of assessment	End-of-semester assessment

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
		30		

TEACHERS:

Mgr Henryk Juszcak,
Dr Marlena Wilk.

COURSE OBJECTIVES:

-
- › **C1** Practising and developing the basic language skills (listening, speaking, reading, writing) necessary to function in an international working environment and in everyday life.
 - › **C2** Learning the necessary general and specialised vocabulary related to the field of study.
 - › **C3** Acquiring intercultural knowledge and skills.

REQUIRED KNOWLEDGE, SKILLS, COMPETENCES:

1. Command of a foreign language at the B1 level according to CEFR (the Common European Framework of Reference for Languages).
2. Ability to work independently and in a group.
3. Ability to use various sources of information, also in a foreign language.

COURSE CONTENT

CLASSES

- › **C1, C2** Lexical - grammatical structures.
 - › **C3, C4** Language structures in use: word formation.
 - › **C5, C6** PLW* Work skills: telephoning.
 - › **C7, C8** Functions: giving advice and suggestions. Language structures in use.
 - › **C9, C10** PLW* Job satisfaction - lexical exercises, conversations.
 - › **C11, C12** Specialised text.**
 - › **C13, C14** Revision.
 - › **C15, C16** Achievement test I.
 - › **C17, C18** Language structures in use - technological innovations. Audiovisual coursework.
 - › **C19, C20** PLW* Professional life challenges - lexical exercises, conversations. Presentation elements.
 - › **C21, C22** PLW * Modern telecommunications solutions for business.
 - › **C23, C24** Functions: new technologies at work. Problems and solutions.
 - › **C25, C26** Specialised text.** Revision.
 - › **C27, C28** Achievement test II.
 - › **C29, C30** Review. Individual student presentations.
- *) PLW - Professional Language in the Workplace.

***)Topics of specialised texts closely related to the characteristics and scope of the field of study.

RESOURCE MATERIALS

1. Fügert N., Grosser R., DaF im Unternehmen B1, Kurs - und Übungsbuch, Klett, 2016 r.
2. Hagner V., Schlüter S., Im Beruf neu, Hueber Verlag, 2021 r.
3. Braunert J., Schlenker W., Unternehmen Deutsch, E. Klett, Stuttgart, 2014 r.
4. Sander I., Braun B., Doubek M., DaF Kompakt D, Klett, Stuttgart, 2015 r.
5. Hilper, S., Kalender S., Kerner M., Schritte international 5, Hueber, 2012 r.
6. Guenat G., Hartmann P., Deutsch für das Berufsleben B1, E. Klett Sprachen GmbH, 2015 r.
7. Braun-Podeschwa J., Habersack Ch., Pude A., Menschen, Huber, 2018 r.
8. Funk H, Kuhn Ch., Studio B1 + kurs DVD, Cornelsen BC edu, Berlin 2012 r.
9. Bosch G., Dahmen K., Schritte international, Hueber Verlag, Ismaning, 2012 r.
10. Eismann V., Erfolgreich bei Präsentationen, Cornelsen Verlag, Berlin 2016 r.

11. R.Kärchner-Ober, Deutsch für Ingenieure B1-B2, Hueber, Warszawa 2015 r.
12. Baberádová H., Język niemiecki w ekonomii: Fremdsprache Deutsch – Finanzen B2/C1, LektorKlett, 2012 r.

SUPPLEMENTARY RESOURCE MATERIALS

1. Wielki Słownik niemiecko-polski/polsko-niemiecki PONS, LektorKlett, Kraków 2010 r.
2. Corbbeil J.-C., Archambault A., Słownik obrazkowy polsko-niemiecki, Klett, Poznań 2007 r.
3. Tarkiewicz U., Deutsche Fachtexte leichter gemacht, Wydawnictwa PCz, Częstochowa 2009 r.
4. Wyszynski J., Sehen, Hören, Verstehen – Ćwiczenia do materiałów audiowizualnych, Wyd. Politechniki Częstochowskiej, Częstochowa 2008 r.
5. Czasopisma: magazin-deutschland.de, Bildung&Wissenschaft.
6. Słowniki mono i bilingwalne, również on-linowe.
7. Aplikacje specjalistyczne oraz zasoby Internetu.

LEARNING OUTCOMES

- › **EU1** The student is able to use a foreign language to the extent necessary to function in a professional environment and typical everyday life situations.
- › **EU2** The student is able to read and understand a popular science text related to his/her field of study.
- › **EU3** The student is able to prepare and deliver a presentation in a foreign language using multimedia.

TEACHING TOOLS

- › General and specialised language textbooks.
- › Purpose built exercises.
- › Audiovisual exercises, multimedia presentations.
- › Internet resources, CUT e-learning platform.
- › Professional dictionaries and online dictionaries.

METHOD OF ASSESSMENT (F- FORMATIVE, S- SUMMATIVE)

- › **F1.** Grade for class preparation.

- › **F2.** Grade for class participation.
- › **F3.** Grade for the achievement test.
- › **F4.** Grade for the presentation.
- › **F5.** Grade for assignments completed in e-learning mode.
- › **P1.** End-of-semester grade*.

*) a prerequisite for obtaining an end-of-semester grade is receiving passing grades in all assignments and achievement tests.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures		
Seminars		
Classes	30	1,2
Laboratories		
Projects		
End-of-semester assessment		
Examination		
Total direct contact classes	30	1,2
Student's unassisted work		
Self-directed study of lectures		
Self-directed preparation for seminars		
Self-directed preparation for tutorials	8	0,32
Self-directed preparation for laboratories		
Self-directed preparation for projects		
Consultations	2	0,08
Preparation for the end-of-semester assessment/examination	10	0,4
Total student's unassisted work	20	0,8
Total student workload	50	2,0

SUPPLEMENTARY INFORMATION

Class times	Information on class times is available at the Office of the Centre for Foreign Languages and in USOS. Foreign language classes are held at the Centre for Foreign Languages at Czestochowa University of Technology, ul. Dąbrowskiego 69 as well as Moodle e-learning platform of Czestochowa University of Technology is used.
Consultation times	Information on consultations is provided to students during the first class of a given course, and is also placed on the website of the Centre for Foreign Languages - www.sjo.pcz.pl

MATRIX OF LEARNING OUTCOMES

Learning outcome	Reference of the given outcome to outcomes defined for the entire programme	Course objectives	Course content	Method of assessment
EU1	K_W09, K_U01, K_U09, K_K04,	C1, C2, C3	C1 - C30	F1, F2, F3, F5, P1
EU2	K_W09, K_U01, K_U09, K_K04,	C1, C2, C3	C11 - C12, C25 - C26	F2, F5, P1
EU3	K_W09, K_U01, K_U09, K_K04,	C1, C2, C3	C17 - C20, C29 - C30	F1, F4, F5

LEARNING OUTCOMES EVALUATION MATRIX

EU1 The student is able to use a foreign language to the extent necessary to function in a professional environment and typical everyday life situations.

- › 2,0 The student is not able to use a foreign language and use appropriate grammatical and lexical structures in a professional environment and typical everyday life situations in both written and oral form. The student's score in the achievement test is below 60%.

- › 3,0 The student is able to use the foreign language to a very limited extent, making numerous mistakes. The student scores between 60-75% in the test.
- › 3,5 A grade of 3,5 is given when the learning outcomes for a grade of 3,0 have been fully achieved, but the student has not fully acquired the learning outcomes for a grade of 4,0.
- › 4,0 The student is able to use the foreign language correctly but occasionally makes mistakes. The student scores between 80-85% in the test.
- › 4,5 A grade of 4,5 is given when the learning outcomes for a grade of 4,0 have been fully achieved, but the student has not fully acquired the learning outcomes for a grade of 5,0.
- › 5,0 The student is able to express himself/herself fluently and spontaneously on professional and social topics and in social interactions. The student's score in the achievement test is above 91%.

EU2 The student is able to read and understand a popular science text related to his/her field of study.

- › 2,0 The student is not able to understand a popular science text he/she reads. The student's score in the reading comprehension test is below 60%.
- › 3,0 The student understands only excerpts from the text he/she reads and has difficulty interpreting it. The student scores between 60-75% in the reading comprehension test.
- › 3,5 A grade of 3,5 is given when the learning outcomes for a grade of 3,0 have been fully achieved, but the student has not fully acquired the learning outcomes for a grade of 4,0.
- › 4,0 The student understands the meaning of the main topics of the text and is able to interpret them. The student scores between 80-85% in the reading comprehension test.
- › 4,5 A grade of 4,5 is given when the learning outcomes for a grade of 4,0 have been fully achieved, but the student has not fully acquired the learning outcomes for a grade of 5,0.
- › 5,0 The student understands everything he/she reads, including details. He/she is able to accurately interpret the text in his/her own words. The student's score in the reading comprehension test is above 91%.

EU 3 The student is able to prepare and deliver a presentation in a foreign language using multimedia.

- › 2,0 The student is not able to prepare and deliver a presentation on a given topic.
- › 3,0 The student is able to prepare a presentation according to the established standards and deliver it but makes numerous language mistakes.
- › 3,5 A grade of 3,5 is given when the learning outcomes for a grade of 3,0 have been fully achieved, but the student has not fully acquired the learning outcomes for a grade of 4,0.
- › 4,0 The student is able to prepare a presentation according to the established standards and deliver it in a clear and communicative manner.
- › 4,5 A grade of 4,5 is given when the learning outcomes for a grade of 4,0 have been fully achieved, but the student has not fully acquired the learning outcomes for a grade of 5,0.
- › 5,0 The student is able to prepare a presentation according to the established standards and deliver it using rich lexis and advanced language and grammatical structures.

Polish course name	ZARZĄDZANIE PROCESAMI PRACY
English course name	WORK PROCESS MANAGEMENT
Course code	WIP-MDL-D1-WPM-05
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	5
Number of ECTS points	3
Ways of assessment	Exam

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15		15		

TEACHERS:

Dr hab. inż. Rafał Prusak, prof. PCz.,

Dr inż. Ewa Staniewska,

Dr inż. Marzena Ogórek.

COURSE OBJECTIVES:

- › **C1** Provide students with knowledge about the organization and management of work processes.
- › **C2** Acquisition of practical skills by students in the analysis of work systems, work processes in terms of individual and group work and the standardization of working time.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Knowledge in the field of management in terms of the characteristics and goals of the organization and its components, planning, steering and controlling processes in enterprises and modern management concepts.
2. Ability to work independently and in a group.
3. Ability to use literature sources and internet resources.

COURSE CONTENT

LECTURE

- › **L1 - L3** The concept and essence of work, structure and features of the enterprise.
- › **L4, L5** Characteristics of the basic information flow channels in the work environment.
- › **L6, L7** Basic forms of work organization.
- › **L8, L9** Workplace organization.
- › **L10, L11** Characteristics of the elements of the material work environment.
- › **L13** Methods of organizing working time.
- › **L14** Job valuation.
- › **L15** Completion of the course.

CLASSES

- › **C1** Acquainting students with the rules of passing the course.
- › **C2** Methods of workplace research.
- › **C3** Statistical control of the production process.
- › **C4 - C7** Methods of measuring working time.
- › **C8 - C10** Working time standardization.
- › **C11, C12** Analysis of labor costs and employment structure.
- › **C13, C14** Employee performance analysis.
- › **C15** Completion of the course.

BASIC REFERENCES

1. Z. Jasiński (red.): Zarządzanie pracą – organizowanie, planowanie, motywowanie, kontrola, Agencja Wydawnicza Placet, Warszawa 1999 r. 363 503.
2. A. Muhleman, J. S. Oakland, K. G. Lockyer: Zarządzanie – produkcja i usługi, Wydawnictwo naukowe PWN, Warszawa 2001 r.
3. I. Durlik: Inżynieria zarządzania. Strategia i projektowanie systemów produkcyjnych. Część II. Placet. Warszawa 1999 r.
4. I. Durlik: Inżynieria zarządzania. Strategie organizacji i zarządzania produkcją, Placet, Warszawa 2000 r.
5. M. Jedliński: Zarządzanie operacyjne, Wyd. Nauk. US, Szczecin 2001 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. D. Waters: Zarządzanie operacyjne. Towary i usługi, WN PWN, Warszawa 2001 r.

LEARNING OUTCOMES

- › **EU1** The student has theoretical knowledge in the field of work management.
- › **EU2** The student is able to independently measure the time of operations using simple methods and techniques, and has the knowledge to participate in work management processes.

TEACHING TOOLS

- › Multimedia presentations.
- › CUT e-learning platform (possible use).

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

- › **F1.** Assessment of knowledge in the field of basic concepts in the field of work management.
- › **P1.** 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	10	0,4
Preparation for seminar		
Preparation for classes	15	0,6

Preparation for lab		
Project preparation		
Consultation	2	0,08
Preparation for the exam	15	0,6
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	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_W02, K_W07, K_U06, K_K01,	C1	L1 - L15, C1 - C15	P1
EU 2	K_W02, K_W07, K_U06, K_K01,	C2	C1 - C15	F1

FORM OF ASSESSMENT - DETAILS

EU1 The student has theoretical knowledge in the field of work management.

- › 2,0 The student has no basic knowledge of work management.
- › 3,0 The student has a basic knowledge of work management.
- › 3,5 The student has a sufficiently plus basic knowledge of work management.
- › 4,0 The student has knowledge of work management.

- › 4,5 The student has mastered the basic knowledge of work management to a good plus degree.
- › 5,0 The student has extensive knowledge of work management.

EU2 The student is able to independently measure the time of operations using simple methods and techniques, as well as has the knowledge that allows him to participate in work management processes.

- › 2,0 The student is not able to independently measure the operation time using simple methods and techniques, and does not have the knowledge to participate in work management processes.
- › 3,0 The student is able to partially independently measure the operation time using simple methods and techniques, as well as has partial knowledge allowing him to participate in work management processes.
- › 3,5 The student is able to measure sufficiently plus the time of the operation by himself using simple methods and techniques, as well as has the knowledge to participate in work management processes.
- › 4,0 The student is able to independently measure the time of operations using simple methods and techniques, and has the knowledge to participate in work management processes.
- › 4,5 The student is able to independently measure the time of the operation using simple methods and techniques, as well as has the knowledge that allows him to participate in work management processes to a good plus degree.
- › 5,0 The student is able to independently measure the time of operations using simple methods and techniques, as well as has considerable knowledge allowing him to participate in work management processes.

Polish course name	ORGANIZACJA I ZARZĄDZANIE PROCESAMI PRODUKCYJNYMI
English course name	ORGANIZATION AND MANAGEMENT OF PRODUCTION PROCESSES
Course code	WIP-MDL-D1-OAMOP-05
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	5
Number of ECTS points	3
Ways of assessment	Exam

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15		15		

TEACHERS:

Dr inż. Cezary Kolmasiak,

Dr inż. Teresa Bajor,

Dr inż. Marzena Ogórek.

COURSE OBJECTIVES:

- › **C1** Provide students with basic knowledge in the field of organization and management of production processes.
- › **C2** Acquainting students with the process approach in management.
- › **C3** Acquisition of practical skills by students in the application of the principles and tools of process management.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Basic knowledge of mathematics and economics.
2. Knowledge of the basics of management and process management.
3. Ability to work independently and in a group.
4. Ability to use literature sources and internet resources.

COURSE CONTENT

LECTURE

- › **L1** Characteristics of the production process.
- › **L2, L3** Types and elements of the production process.
- › **L4** The technological cycle and the production cycle, characteristics and structure of the cycle.
- › **L5** Schedules of the production process.
- › **L6** Planning and control of production flow.
- › **L7** Lengths of the production cycle. Work in progress.
- › **L8** Continuous flow. Managing production capacity. Methods of operation synchronization in the production process.
- › **L9** APS systems.
- › **L10, L11** Flexible production systems.
- › **L12, L13** Production planning and management systems (MES, ERP).
- › **L14, L15** Means of production in various branches of the economy.

CLASSES

- › **C1** Acquainting students with the rules of completing the course and the course of carrying out project exercises.
- › **C2** Production system. Characteristics, specific features and classification of typical systems, processes and production techniques.
- › **C3** Determining the time of implementation of technological operations.
- › **C4** Methods of increasing the productivity of processes.
- › **C5** Risk in planning production orders.
- › **C6** Design of production systems. Construction of schedules for the course of production processes.
- › **C7** 5S Practices.
- › **C8** Lean Manufacturing.
- › **C9, C10** Total Quality Management, Six Sigma.
- › **C11** Kaizen - continuous improvement, "5 × why?".
- › **C12** Balancing the assembly line.
- › **C13** Total equipment efficiency.
- › **C14, C15** Means of production used in various branches of the economy.

BASIC REFERENCES

1. M. Brzeziński: Organizacja podstawowych procesów produkcyjnych, PL, Lublin 1997 r.
2. K. Pasternak: Zarys zarządzania produkcją, PWE, Warszawa 2005 r.
3. S. Borkowski, R. Ulewicz: Zarządzanie produkcją. Systemy produkcyjne, Oficyna wydawnicza HUMANITAS, Sosnowiec 2008 r.
4. I. Durlik: Inżynieria Zarządzania Cz.II - strategie wytwarzania, Placet, Warszawa 2005 r.
5. I Durlik: Strategia i projektowanie systemów produkcyjnych, Placet, Gdańsk 1996 r.
6. R. Knosala: Inżynieria produkcji kompendium wiedzy, PWE, Warszawa, 2017 r.
7. P. Gajewski: Koncepcja struktury organizacji procesowej, Dom Organizatora, Toruń 2003 r.
8. T. Kaczmarczyk: Ryzyko i zarządzanie ryzykiem. Difin, Warszawa 2005 r.
9. I. Durlik: Inżynieria zarządzania: strategia i projektowanie systemów produkcyjnych, cz. 1, Placet, Warszawa, 2007 r.
10. E. Kulińska, A. Busławski: Zarządzanie procesami produkcji, Warszawa, Difin, 2019 r.
11. W. M. Grudziewski: Metody projektowania systemów zarządzania, Difin, Warszawa, 2004 r.
12. E. Janczyk-Strzała: Controlling w przedsiębiorstwach produkcyjnych, CeDeWu, Warszawa, 2008 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. T. Kaczmarczyk: Zarządzanie ryzykiem. Ujęcie interdyscyplinarne, Difin, Warszawa, 2010 r.
2. K. Kukuła: Badania operacyjne w przykładach i zadaniach. PWN, Warszawa 2004 r.

LEARNING OUTCOMES

- › **EU1** The student has theoretical knowledge in the field of production process management.

- › **EU2** The student knows the trends and directions of development of production process management.

TEACHING TOOLS

- › Lecture and classes with audio-visual aids.
- › Design classes carried out in the form of partial works with the use of computers.
- › E-learning platform of the Czestochowa University of Technology, or other distance learning tools.

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

- › **F1.** Assessment of activity during classes.
- › **F2.** Assessment of the prepared presentation.
- › **P1.** 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	2	0,08
Total contact hours	32	1,28
Student's own work		
Getting acquainted with the indicated literature	10	0,4
Preparation for seminar		
Preparation for classes	25	1,0
Preparation for lab		
Project preparation		
Consultation	2	0,08
Preparation for the exam	6	0,24
Total student's own work	43	1,72

Total number of hours/ ECTS points for the course	75	3,0
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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_W02, K_W03, K_W05, K_U04, K_K01,	C1, C2, C3	L1 - L15 C1 - C15	F1, F2, P1
EU 2	K_W02, K_W03, K_W05, K_U04, K_K01,	C1, C2, C3	L1 - L15 C1 - C15	F1, F2, P1

FORM OF ASSESSMENT - DETAILS

EU1 The student has theoretical knowledge in the field of production process management.

- › 2,0 The student has not mastered the basic knowledge of production process management.
- › 3,0 The student has acquired a sufficient knowledge of the management of production processes.
- › 3,5 The student acquired the knowledge of production process management to a more than sufficient degree.
- › 4,0 The student has acquired a good knowledge of the management of production processes.

- › 4,5 acquired knowledge in the field of production process management to an over good degree.
- › 5,0 The student has acquired a very good knowledge of the management of production processes.

EU2 The student knows the trends and directions of development of production process management.

- › 2,0 The student does not know the trends and directions of development of production process management.
- › 3,0 The student is able to present the basic trends and directions of development of production process management.
- › 3,5 The student fully meets the requirements for the grade 3,0 and exceeds them, but does not fully meet the requirements for the grade 4,0.
- › 4,0 The student is able to present selected trends and directions of development of production process management.
- › 4,5 The student fully meets the requirements for the grade 4,0 and exceeds them, but does not fully meet the requirements for the grade 5,0.
- › 5,0 The student knows the trends and directions of development of production process management with a very good grade.

Polish course name	INFRASTRUKTURA LOGISTYCZNA
English course name	LOGISTICS INFRASTRUCTURE
Course code	WIP-MDL-D1-LI-05
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	5
Number of ECTS points	2
Ways of assessment	Test

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15		15		

TEACHERS:

Dr Mateusz Chład,

Dr hab. inż. Anna Brzozowska, prof. PCz.,

Dr Judyta Kabus.

COURSE OBJECTIVES:

-
- › **C1** Acquiring the knowledge and skills necessary for operational logistics management.
 - › **C2** Getting to know the issues related to the logistics infrastructure.
-

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. The student knows the basic issues of logistics and logistic management.
2. The student knows the basic issues of business management, especially in the context of costs, finance and capital.
3. The student is able to analyze the logistic activity in the functional areas of the economic entity.

COURSE CONTENT

LECTURE

- › **L1, L2** Overview of the lecture schedule. Introduction to issues related to logistics infrastructure, basic terms.
- › **L3** Division and main elements of logistics infrastructure.
- › **L4** Logistics infrastructure - basic concepts.
- › **L5, L6** Logistics infrastructure - broken down by branches.
- › **L7, L8** Storage and handling infrastructure.
- › **L9, L10** The role of logistics centers in the logistics infrastructure.
- › **L11, L12** Packaging infrastructure.
- › **L13, L14** IT infrastructure.
- › **L15** The revision and supplementation of the material.

CLASSES

- › **C1** Introductory class - discussion of the subject matter and rules for passing the course.
- › **C2** Logistics system, process and structure. Division of logistics infrastructure.
- › **C3, C4** Logistics centres versus logistics infrastructure.
- › **C5** Demonstrate how to solve storage decision-making tasks.
- › **C6** Solving storage tasks.
- › **C7** Solving tasks on transport decisions, helping to choosing the right mode of transport.
- › **C8** Solving tasks relating to transport decisions.
- › **C9, C10** Selecting a suitable site for logistics facilities. Demonstration of how to solve tasks with topics on location decisions.
- › **C11** Addressing the issue of packaging infrastructure.
- › **C12, C13** Case study on logistics infrastructure in terms of IT systems used.
- › **C14** Repetition of messages and completion of missing information.
- › **C15** Colloquium.

BASIC REFERENCES

1. Kozłowski M., Porty lotnicze - infrastruktura, eksploatacja i zarządzanie, Oficyna Wydaw. Politechniki Warszawskiej, Warszawa 2015 r.
2. Liberadzki M., Finansowanie infrastruktury transportowej w Polsce: innowacyjne instrumenty finansowe: publiczno-prywatne partnerstwo, Oficyna Wydaw. Szkoła Główna Handlowa, Warszawa 2014 r.

3. Markusik S., Infrastruktura logistyczna w transporcie/T. 3 Cz. 1, Wydaw. Politechniki Śląskiej, Gliwice 2013 r.
4. Szarata A., Modelowanie podróży wzbudzonych oraz tłumionych zmianą stanu infrastruktury transportowej. Inżynieria lądowa, Wydaw. Politechniki Krakowskiej im. Tadeusza Kościuszki, Kraków 2013 r.
5. Brzozowska A., Lis T., Najważniejsze porty transportu morskiego i śródlądowego w Niemczech i Polsce, Logistyka nr 6/2013 r.
6. Brzozowska A., Terminale kontenerowe w sektorze transportu morskiego - przykład BCT, Logistyka nr 5/2013.
7. Brzozowska A., Zarządzanie w globalnych sieciach transportowych, Gospodarka Materiałowa & Logistyka, nr 10 (1226)/ 2013.
8. Kozubek P. R., Efektywność inwestycji infrastrukturalnych w transporcie kolejowym: analiza i ocena, Wydaw. Politechniki Świętokrzyskiej, Kielce 2012 r.
9. Łukasiewicz A., Interesariusze w przedsięwzięciach infrastruktury drogowej i kolejowej, Instytut Badawczy Dróg i Mostów, Warszawa 2012 r.
10. Towpik K., Koleje dużych prędkości: infrastruktura drogi kolejowej, Oficyna Wydaw. Politechniki Warszawskiej, Warszawa 2012 r.
11. Kozubek P. R., Ocena transportowych inwestycji infrastrukturalnych współfinansowanych z funduszy Unii Europejskiej, Instytut Nauk.-Wydaw. SPATIUM, Radom 2011 r.
12. Markusik S., Infrastruktura logistyczna w transporcie/T. 2, Wydaw. Politechniki Śląskiej, Gliwice 2010 r.
14. Brzozowska A., Organization of Transport. Theoretical Approach, (in:) Brzozowska A., red. Economical and Organizational Aspects of Transportation.
15. Kabus J., Znaczenie technologii informatycznych w zarządzaniu łańcuchem dostaw, [w:] Logistyka nr 6, 2014, s. 14305-14310.

SUPPLEMENTARY REFERENCE MATERIALS

1. Brzozowska A., Miler R. K., Implementation of the Green Shipping Practices as an Element of the Maritime Transport Restructuring Processes, Publishing House: Foundation of the Cracow University of Economics, Kraków 2017 r.
2. Kabus J., Miciuła I., Piersiala L., Risk in Supply Chain Management, [w:] European Research Studies Journal, Vol. 23, Iss. 4, 2020 r., s. 467-480.

3. Nowicka-Skowron M., Brzozowska A., Nowakowska-Grunt J., Systemy transportowe a polityka zrównoważonego rozwoju w Unii Europejskiej (w:) Wielowymiarowość zarządzania XXI wieku (red.) Jakubiec Marcin, Barcik Agnieszka Bielsko-Biała: Wydawnictwo Naukowe Akademii Techniczno-Humanistycznej w Bielsku-Białej, 2018 r.
4. Chłąd M., Analysis and Development of Sustainable Transport Development in Selected EU Countries, Institute of Economic Research, Toruń, 2019 r.
5. Chłąd M., Nowakowska – Grunt J., Directions of the Transport System Development on the Example of Selected Cities, Transportation Research Procedia, Vol.39, 2019 r.

LEARNING OUTCOMES

- › **EU1** The student has knowledge and can see the current trends in infrastructure development.
- › **EU2** The student knows the basic concepts related to logistics infrastructure, can characterize its elements and make a division.

TEACHING TOOLS

- › Lecture with the use of audiovisual means.
- › Exercises - reference materials, textbook and script.

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

- › **F1.** Assessment of the implementation of tasks included in the curriculum.
- › **F2.** Assessment of the mastery of the teaching material being the subject of exercises - final test.
- › **P1.** Assessment of the mastery of the teaching material within the lectures - final 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	7	0,28
Preparation for seminar		
Preparation for classes		
Preparation for lab		
Project preparation		
Consultation	4	0,16
Preparation for the test	6	0,24
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-stStationne
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_U04, K_K01,	C1, C2	L1 - L15, C1 - C15	F1, F2, P1

EU 2	K_W01, K_W02, K_U04, K_K01,	C1, C2	L1 - L15 C1 - C15	F1, F2, P1
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FORM OF ASSESSMENT - DETAILS

EU1 The student has knowledge and can see the current trends in infrastructure development.

- › 2,0 The student does not know the basic rules of logistics infrastructure.
- › 3,0 The student knows the basic rules of logistics infrastructure , but is unable to use it in practice.
- › 3,5 The student almost knows the basic rules in the field of logistics infrastructure.
- › 4,0 The student knows the general knowledge of logistics infrastructure well and understands the current development trends and is able to use them in practice.
- › 4,5 Student has almost very good information on logistics infrastructure.
- › 5,0 The student knows the basic rules of logistics infrastructure very well and knows how to use it in practice, relating it to the current development trends.

EU2 The student knows the basic concepts related to logistics infrastructure, can characterize its elements and make a division.

- › 2,0 The student is not able to define the scope of the logistics infrastructure.
- › 3,0 The student knows the basic rules of logistics infrastructure, but is unable to use it in practice.
- › 3,5 The student can almost define the basic rules in the field of logistics infrastructure.
- › 4,0 The student is able to present general knowledge of logistics infrastructure in organizational and economic terms and is able to use it in practice.
- › 4,5 The student is able to determine information in the field of logistics infrastructure almost very well.
- › 5,0 The student knows the basic rules of logistics infrastructure very well and knows how to use it in practice, relating it to the current development trends.

Polish course name	NOWOCZESNE TECHNIKI WYTWARZANIA
English course name	MODERN MANUFACTURING TECHNIQUES
Course code	WIP-MDL-D1-MMT-05
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	5
Number of ECTS points	7
Ways of assessment	Test

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
30			30	30

TEACHERS:

Dr inż. Małgorzata Łągiewka,

Dr hab. inż. Adam Cwudziński, prof. PCz.,

Dr hab. inż. Grzegorz Stradomski, prof. PCz.

COURSE OBJECTIVES:

- › **C1** Provide students with knowledge in the field of modern manufacturing techniques.
- › **C2** Acquisition by students of practical skills in the selection of technologies for the production of metals and metal products depending on the type and purpose.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Basic knowledge of physics, chemical and materials science.
2. Basic knowledge of basic manufacturing techniques and production processes.
3. Ability to work independently and in a group.
4. Ability to use literature sources and internet resources.

COURSE CONTENT

LECTURE

- › **L1 - L5** Manufacturing techniques of modern steels and metal alloys.
- › **L6** Environmental aspect in metal production technologies.
- › **L7 - L11** Modern technologies for the production of castings.
- › **L12, L13** Machines and devices in modern foundries.
- › **L14, L15** BAT technologies in metal plants.
- › **L16 - L20** Modern technologies for the production of plastically processed products.
- › **L21, L22** Machines and devices in modern plastic forming plants.
- › **L23, L24** Modern techniques of rapid prototyping.
- › **L25, L26** Industrial measuring systems.
- › **L27, L28** Design of technological processes.
- › **L29, L30** Measurement techniques in the metal industry.

LABORATORY

- › **Lab1 - Lab5** Experimental determination of the transition zone during continuous casting of slabs/Experimental determination of the hydrodynamic structure in the COS crystallizer.
- › **Lab6 - Lab10** Observation of steel smelting and continuous casting in industrial conditions - fieldwork/Experimental determination of the relationship between the basicity of slag and the degree of desulphurization of the liquid iron alloy/Sintering of iron ore.
- › **Lab11 - Lab15** Centrifugal, precision and pressure casting.
- › **Lab16 - Lab20** Modern materials for foundry molds and castings.
- › **Lab21 - Lab25** Drawing and rolling.
- › **Lab26 - Lab30** Conducting tests of mechanical properties for selected plastic worked elements. Carrying out upsetting tests.

PROJECT

- › **P1 - P10** Completion of the industrial technology project for the production of selected metals.
- › **P11 - P20** Preparation of technological documentation of the selected casting.
- › **P21 - P30** Designing the technology for the production of plastically processed elements.

BASIC REFERENCES

1. T. Lis: Współczesne metody otrzymywania stali, Wyd. Politechniki Śląskiej, Gliwice 2000 r.
2. A. Ghosh: Secondary Steelmaking: Principles and Applications, CRC Press, 2001 r.
3. J. Jowša: Inżynieria procesów kadziowych w metalurgii stali, Wyd. Pol. Częst., Częstochowa, 2008 r.
4. Y. Sahai, T. Emi: Tundish Technology for Clean Steel Production, World Scientific Press, 2008 r.
5. Botor J.: Podstawy metalurgicznej inżynierii procesowej, Wyd. Politechniki Śląskiej, Gliwice, 1999 r.
6. M. Holzer: Procesy metalurgiczne i odlewnicze stopów żelaza. Podstawy fizykochemiczne, Wyd. PWN, Warszawa 2013 r.
7. Blacha L.: Metalurgia próżniowa, Wyd. Politechniki Śląskiej, Gliwice 2005 r.
8. A. Kosowski: Podstawy odlewnictwa, Wydawnictwo Naukowe AKAPIT, Kraków, 2008 r.
9. T. Warchała: Technologia modelu i formy. Cz. I i II. Skrypt P.Cz., Częstochowa 1984, 1985 r.
10. J.L. Lewandowski: Masy formierskie i rdzeniowe. PWN, Warszawa 1991 r.
11. M. Skarbiński, J. Skarbiński: Technologiczność konstrukcji maszyn. WNT, Warszawa 1987 r.
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13. A. Tabor, J.S. Rączka: Projektowanie odlewów i technologii form Fotobit, Kraków, 1998 r.
14. W. Gorecki: Inżynieria wytwarzania i przetwórstwa płaskich wyrobów metalowych. Wyd. Politechniki Śląskiej 2006 r.
15. J. Łuksza, A. Skołyśzewski, F. Witek, W. Zachariasz: Druty ze stali i stopów specjalnych. Wydawnictwo Naukowo-Techniczne, Warszawa 2006 r.
16. J. Herian: Wybrane techniki wytwarzania wyrobów metalowych. Wydawnictwo Politechniki Śląskiej 2004 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. Poradnik inżyniera. Odlewnictwo tom 1 i 2. Praca zbiorowa. WNT, Warszawa 1986 lub dostępne wydanie.

2. J. Hankus: Budowa i własności mechaniczne lin stalowych. Główny Instytut Górnictwa, Katowice 2000 r.
3. B. Maligowski, M. Pofelski: Wyroby z drutu. Wyd. Śląsk, 1970 r.
4. J. Kasprzak: Liny stalowe. Wyd. Śląsk, 1973 r.

LEARNING OUTCOMES

- › **EU1** The student has a basic knowledge of the processes of producing metals and alloys, casting and plastic forming of metal products.
- › **EU2** The student knows the basic machines, devices and tools for the production of metal products.
- › **EU3** The student is able to use the basic knowledge in the field of technological processes used in the production of metal products to design the finished product.

TEACHING TOOLS

- › Lecture with the use of audiovisual means.
- › Specialist laboratory.
- › Computer software.
- › CUT e-learning platform (possible use).

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

- › **F1.** Assessment of preparation for laboratory classes.
- › **F2.** Assessment of preparation for design classes.
- › **P1.** Assessment of the ability to prepare technological documentation.
- › **P2.** Assessment of the preparation for the final test of the lectures.

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	30	1,2

Test	5	0,2
Exam		
Total contact hours	95	3,8
Student's own work		
Getting acquainted with the indicated literature	25	1
Preparation for seminar		
Preparation for classes		
Preparation for lab	20	0,8
Project preparation	30	1,2
Consultation	2	0,08
Preparation for the test	3	0,12
Total student's own work	80	3,2
Total number of hours/ ECTS points for the course	175	7,0

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_W03, K_W04,	C1, C2	L1 - L30	F1, F2, P1
EU 2	K_W03, K_W04, K_U03, K_U04, K_U05, K_K02,	C1, C2	L1 - L30 Lab1 - Lab30	F1, F2, P1
EU 3	K_W03, K_W04,	C1, C2	P1 - P30	F1, F2, P1

	K_U03, K_U04, K_U05, K_K02,			
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FORM OF ASSESSMENT - DETAILS

EU1 The student has a basic knowledge of the processes of producing metals and alloys, casting and plastic forming of metal products.

- › 2,0 The student has no basic knowledge of the processes of producing metals and alloys, casting and plastic forming of metal products.
- › 3,0 The student has some knowledge of the processes of producing metals and alloys, casting and plastic forming of metal products.
- › 3,5 The student almost knows the processes of producing metals and alloys, casting and plastic forming of metal products.
- › 4,0 The student knows well the processes of producing metals and alloys, casting and plastic forming of metal products.
- › 4,5 The student knows almost very well the processes of producing metals and alloys, casting and plastic forming of metal products.
- › 5,0 The student knows very well the processes of producing metals and alloys, casting and plastic forming of metal products.

EU2 The student knows the basic machines, devices and tools for the production of metal products

- › 2,0 The student does not have basic knowledge about machines, devices and tools for the production of metal products.
- › 3,0 The student has some knowledge of machines, devices and tools for the production of metal products.
- › 3,5 Student knows almost about the machines, devices and tools used to manufacture metal products.
- › 4,0 The student knows well the machines, devices and tools for the production of metal products.
- › 4,5 The student knows almost the machines, devices and tools used to manufacture metal products.
- › 5,0 The student knows the machines, devices and tools for the production of metal products very well.

EU3 The student is able to use the basic knowledge in the field of technological processes used in the production of metal products to design the finished product.

- › 2,0 The student is not able to use the knowledge of technological processes used in the production of metal products to design a finished product.
- › 3,0 The student is able to partially use the basic knowledge of technological processes used in the production of metal products to design a finished product.
- › 3,5 The student can almost use the basic knowledge of the technological processes used in the production of metal products to design the finished product.
- › 4,0 The student is able to use the basic knowledge in the field of technological processes used in the production of metal products to prepare the finished product design.
- › 4,5 The student is able to use the basic knowledge in the field of technological processes used in the production of metal products almost very well to perform the design of the finished product.
- › 5,0 Student to make good use of the basic knowledge in the field of technological processes used in the production of metal products to design the finished product.

Polish course name	RAPORTOWANIE I PREZENTACJA DANYCH
English course name	REPORTING AND DATA PRESENTATION
Course code	WIP-MDL-D1-RADP-05
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	5
Number of ECTS points	4
Ways of assessment	Test

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15			30	

TEACHERS:

Dr inż. Marcin Kwapisz.

COURSE OBJECTIVES:

- › **C1** Learning about selected issues related to the acquisition, processing, analysis and mathematical and graphical presentation of process data from industrial processes and the functioning of dedicated systems.
- › **C2** Acquisition of knowledge and practical skills in the processing and analysis of process data.
- › **C3** Acquisition of knowledge and skills in the field of presentation of measurement and statistical data.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Knowledge of the basics of computer science and computer operation.
2. The ability to reason logically and build logical sentences.
3. Ability to use literature sources and internet resources.
4. The ability to correctly interpret your own actions.
5. The student has a basic knowledge of materials science.
6. He knows the basics of manufacturing technology.

COURSE CONTENT

LECTURE

- › **L1** Type and nature of process data.
- › **L2** Structures and properties of process data processing systems.
- › **L3** Processing and transmission of data from sensors in industry.
- › **L4** Data exchange formats.
- › **L5** Measurement error and uncertainty of measurement results.
- › **L6** Statistical analysis of measurement data.
- › **L7** Probability distributions.
- › **L8** Data smoothing, reduction and compression.
- › **L9** Concepts of interpolation, approximation and extrapolation of measurement data.
- › **L10** Regression analysis and correlation.
- › **L11, L12** Preparation of reports and summaries.
- › **L13 - L15** Methods of graphical data presentation.

LABORATORY

- › **Lab1, Lab2** Introduction to laboratory activities.
- › **Lab3 - Lab6** Working in a spreadsheet.
- › **Lab9 - Lab12** Processing and statistical analysis of measurement data.
- › **Lab13 - Lab16** Preparation of reports.
- › **Lab17 - Lab20** Visualization of measurement data.
- › **Lab21 - Lab26** Development and graphic presentation of research results.
- › **Lab27 - Lab30** Preparation of data presentation.

BASIC REFERENCES

1. P. McFedries: Excel. Wykresy, analiza danych, tabele przestawne. Helion, 2015 r.
2. M. Korzyński: Metodyka eksperymentu, Planowanie, realizacja i statystyczne opracowanie wyników eksperymentów technologicznych, Wydawnictwo Naukowe PWN, 2017 r.
3. D. Larose: Metody i modele eksploracji danych, Wydawnictwo Naukowe PWN, 2008 r.

SUPPLEMENTARY REFERENCE MATERIALS

Internet resources

LEARNING OUTCOMES

- › **EU1** Has knowledge and skills in the field of processing and analysis of measurement data.
- › **EU2** Has knowledge and skills in reporting process data.
- › **EU3** Has knowledge and skills related to the graphical presentation of data.

TEACHING TOOLS

- › Lecture with the use of audiovisual means.
- › Laboratory - desktop computers.
- › Computer software CAD software.
- › Teaching materials prepared by the teacher.
- › E-learning platform of the Częstochowa University of Technology or other distance learning tools.

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

- › **F1.** Assessment of the implementation of tasks included in the curriculum.
- › **F2.** Assessment of the mastery of the teaching material being the subject of laboratory tasks - final test.
- › **F3.** Assessment of activity during classes.
- › **P1.** Assessment of the mastery of the teaching material within the lectures - final test.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures	15	0,6
Seminar		
Classes		
Laboratory	30	1,2
Project		
Test	2	0,08

Exam		
Total contact hours	47	1,88
Student's own work		
Getting acquainted with the indicated literature	10	0,4
Preparation for seminar		
Preparation for classes		
Preparation for lab	30	1,2
Project preparation		
Consultation	3	0,12
Preparation for the test	10	0,4
Total student's own work	53	2,12
Total number of hours/ ECTS points for the course	100	4,0

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_U04,	C1, C2, C3	L1 - L15, Lab1 - Lab30	F1 - F3, P1
EU 2	K_W01, K_U04,	C1, C2, C3	L1 - L15, Lab1 - Lab30	F1 - F3, P1
EU 3	K_W01, K_U04,	C1, C2, C3	L1 - L15, Lab1 - Lab30	F1 - F3, P1

FORM OF ASSESSMENT - DETAILS

EU1 Has knowledge and skills in the field of processing and analysis of measurement data.

- › 2,0 Does not have knowledge and skills in the field of processing and analysis of measurement data.
- › 3,0 Has sufficient knowledge and skills in the scope of issues related to the processing and analysis of measurement data.
- › 3,5 Has sufficient knowledge and skills in the scope of issues related to the processing and analysis of measurement data to a sufficient degree plus.
- › 4,0 Has the knowledge and skills in the field of issues related to the processing and analysis of measurement data to a good degree.
- › 4,5 Has knowledge and skills in the scope of issues related to the processing and analysis of measurement data to a good plus degree.
- › 5,0 Has a very good knowledge and skills in the field of processing and analysis of measurement data.

EU2 Has knowledge and skills in reporting process data.

- › 2,0 Has no knowledge and skills related to process data reporting.
- › 3,0 Has sufficient knowledge and skills in reporting process data.
- › 3,5 Has sufficient knowledge and skills in reporting process data plus.
- › 4,0 Has good knowledge and skills in reporting process data.
- › 4,5 Has good plus knowledge and skills in reporting process data.
- › 5,0 Has a very good knowledge and skills in reporting process data.

EU 3 Has knowledge and skills related to the graphical presentation of data.

- › 2,0 There is no knowledge and skills related to the graphical representation of data
- › 3,0 Has sufficient knowledge and skills related to the graphic presentation of data.
- › 3,5 Has sufficient knowledge and skills related to the graphical presentation of data, plus
- › 4,0 Has good knowledge and skills related to graphic presentation of data.
- › 4,5 Has good plus knowledge and skills related to the graphical presentation of data.
- › 5,0 Has a very good knowledge and skills related to the graphical presentation of data.

Polish course name	INFRASTRUKTURA TRANSPORTU
English course name	TRANSPORT INFRASTRUCTURE
Course code	WIP-MDL-D1-TI-05
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	5
Number of ECTS points	2
Ways of assessment	Test

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15		15		

TEACHERS:

Dr Judyta Kabus,

Dr hab. inż. Anna Brzozowska, prof. PCz.,

Dr Mateusz Chład.

COURSE OBJECTIVES:

- › **C1** Provide students with knowledge in the field of transport infrastructure, the specifics of transport infrastructure, barriers to the development of transport infrastructure, ways of transport's impact on the environment and contemporary challenges to transport.
- › **C2** Gaining the knowledge necessary to present and justify the reasons for the current state of development of transport infrastructure for individual modes of transport.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. The ability to use the acquired knowledge when making decisions about transport infrastructure.
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2. The ability to analyze and evaluate the condition of transport infrastructure.

COURSE CONTENT

LECTURE

- › **L1** Introduction to the subject. Presentation of basic concepts and terms related to transport infrastructure.
- › **L2 - L4** Specifics of road transport infrastructure.
- › **L5, L6** The specificity of railway transport infrastructure.
- › **L7, L8** Specifics of air transport infrastructure.
- › **L9 - L11** Specifics of water and inland transport infrastructure.
- › **L12, L13** Specifics of transmission infrastructure.
- › **L14, L15** Trends in the development of transport infrastructure.

CLASSES

- › **C1, C2** Introductory classes - explanation of how to perform individual tasks and presentations on selected types of transport infrastructures.
- › **C3, C4** Comprehensive analysis of selected types of transport infrastructures.
- › **C5, C6** Activities of transport infrastructures for the development of national and international transport - presentation of a comparative analysis, discussion.
- › **C7, C8, C9** Presentation and discussion of the functioning of enterprises based on the infrastructure used - the case study.
- › **C10, C11, C12** Critical discussion of the presented topics in terms of the assessment of road, rail and air transport infrastructure (presentations in electronic form).
- › **C13, C14, C15** Critical discussion of the presented topics in terms of the assessment of water, inland and transmission infrastructure (presentations in electronic form).

BASIC REFERENCES

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 2. Liberadzki M., Finansowanie infrastruktury transportowej w Polsce: innowacyjne instrumenty finansowe: publiczno-prywatne partnerstwo, Oficyna Wydaw. Szkoła Główna Handlowa, Warszawa 2014 r.
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3. Markusik S., Infrastruktura logistyczna w transporcie/T. 3 Cz. 1, Wydaw. Politechniki Śląskiej, Gliwice 2013 r.
4. Szarata A., Modelowanie podróży wzbudzonych oraz tłumionych zmianą stanu infrastruktury transportowej. Inżynieria lądowa, Wydaw. Politechniki Krakowskiej im. Tadeusza Kościuszki, Kraków 2013 r.
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7. Brzozowska A., Zarządzanie w globalnych sieciach transportowych, Gospodarka Materiałowa & Logistyka, nr 10 (1226)/2013.
8. Kozubek P. R., Efektywność inwestycji infrastrukturalnych w transporcie kolejowym: analiza i ocena, Wydaw. Politechniki Świętokrzyskiej, Kielce 2012 r.
9. Łukasiewicz A., Interesariusze w przedsięwzięciach infrastruktury drogowej i kolejowej, Instytut Badawczy Dróg i Mostów, Warszawa 2012 r.
10. Towpik K., Koleje dużych prędkości: infrastruktura drogi kolejowej, Oficyna Wydaw. Politechniki Warszawskiej, Warszawa 2012 r.
11. Kozubek P. R., Ocena transportowych inwestycji infrastrukturalnych współfinansowanych z funduszy Unii Europejskiej, Instytut Nauk.-Wydaw. SPATIUM, Radom 2011 r.
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15. Kabus J., Znaczenie technologii informatycznych w zarządzaniu łańcuchem dostaw, [w:] Logistyka nr 6, 2014 r., s. 14305-14310.

SUPPLEMENTARY REFERENCE MATERIALS

1. Brzozowska A., Miler R. K., Implementation of the Green Shipping Practices as an Element of the Maritime Transport Restructuring Processes, Publishing House: Foundation of the Cracow University of Economics, Kraków 2017 r.
2. Kabus J., Miciuła I., Piersiala L., Risk in Supply Chain Management, [w:] European Research Studies Journal, Vol. 23, Iss. 4, 2020 r., s. 467-480.

3. Nowicka-Skowron M., Brzozowska A., Nowakowska-Grunt J., Systemy transportowe a polityka zrównoważonego rozwoju w Unii Europejskiej (w:) Wielowymiarowość zarządzania XXI wieku (red.) Jakubiec Marcin, Barcik Agnieszka Bielsko-Biała: Wydawnictwo Naukowe Akademii Techniczno-Humanistycznej w Bielsku-Białej, 2018 r.
4. Chłąd M., Analysis and Development of Sustainable Transport Development in Selected EU Countries, Institute of Economic Research, Toruń, 2019 r.
5. Chłąd M., Nowakowska – Grunt J., Directions of the Transport System Development on the Example of Selected Cities, Transportation Research Procedia, Vol.39, 2019 r.

LEARNING OUTCOMES

- › **EU1** The student has knowledge and can see the current trends in the development of infrastructure.
- › **EU2** The student has knowledge of the transport infrastructure in organizational and economic terms.

TEACHING TOOLS

- › Lecture with the use of audiovisual means.
- › Exercises - reference materials, textbook and script.

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

- › **F1.** Assessment of the implementation of tasks included in the curriculum.
- › **F2.** Assessment of the mastery of the teaching material being the subject of exercises - final test.
- › **P1.** Assessment of the mastery of the teaching material within the lectures - final 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	7	0,28
Preparation for seminar		
Preparation for classes		
Preparation for lab		
Project preparation		
Consultation	4	0,16
Preparation for the test	6	0,24
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-stStationne
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_U04, K_K01,	C1, C2	L1 - L15 C1 - C15	F1, F2, P1

EU 2	K_W01, K_W02, K_U04, K_K01,	C1, C2	L1 - L15 C1 - C15	F1, F2, P1
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FORM OF ASSESSMENT - DETAILS

EU1 The student has knowledge and can see the current trends in infrastructure development.

- › 2,0 The student does not know the basic rules of transport infrastructure.
- › 3,0 The student knows the basic rules of transport infrastructure, but is unable to use it in practice.
- › 3,5 The student almost knows the basic rules in the field of transport infrastructure.
- › 4,0 The student knows the general knowledge of transport infrastructure well and understands the current development trends and is able to use them in practice.
- › 4,5 Student has almost very good information on transport infrastructure.
- › 5,0 The student knows the basic rules of transport infrastructure very well and knows how to use it in practice, relating it to the current development trends.

EU2 The student has knowledge of the transport infrastructure in organizational and economic terms.

- › 2,0 The student is not able to define the scope of the transport infrastructure.
- › 3,0 The student knows the basic rules of transport infrastructure, but is unable to use it in practice.
- › 3,5 The student can almost define the basic rules in the field of transport infrastructure.
- › 4,0 The student is able to present general knowledge of transport infrastructure in organizational and economic terms and is able to use it in practice.
- › 4,5 The student is able to determine information in the field of transport infrastructure almost very well.
- › 5,0 The student knows the basic rules of transport infrastructure very well and knows how to use it in practice, relating it to the current development trends.

Polish course name	LEAN MANAGEMENT
English course name	LEAN MANAGEMENT
Course code	WIP-MDL-D1-LM-06
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	6
Number of ECTS points	3
Ways of assessment	Test

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15		15		15

TEACHERS:

Dr inż. Monika Górska,

Dr inż. Edyta Kardas,

Dr inż. Zbigniew Skuza.

COURSE OBJECTIVES:

- › **C1** Providing students with knowledge of the principles of management and lean management.
- › **C2** To acquaint students with the basic tools of lean management and production in the management structure of the enterprise.
- › **C3** Acquisition by the student of the ability to design value stream maps with improvements.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Basic knowledge of economics and management and production processes.
2. Ability to work independently and in a group.
3. Ability to use literature sources and internet resources.

COURSE CONTENT

LECTURE

- › **L1** Introduction to Lean Management & Manufacturing.
- › **L2** Process improvement and Lean tools.
- › **L3** Value stream mapping.
- › **L4** Business models for Lean Manufacturing, Lean culture.

CLASSES

- › **C1** Acquainting students with the rules of passing the course. Introduction to exercises.
- › **C2** Application of selected Lean methods and tools in processes.
- › **C3** Visual stream mapping and future state map.
- › **C4** Case study analysis and discussion.

PROJECT

- › **P1 - P15** Project using Lean methods and tools.

BASIC REFERENCES

1. S. Borkowski, J. Selejdak, S. Salamon: Efektywność eksploatacji maszyn i urządzeń, Politechnika Częstochowska, Częstochowa 2006 r.
2. A. Łazicki: Lean Manufacturing – praktyczne zastosowanie metodologii, e-book, 2015 r.
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4. E. Pawłowski, K. Pawłowski, S. Trzcieliński: Metody i narzędzia Lean Manufacturing, Wydawnictwo Politechniki Poznańskiej, Poznań 2010 r.
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1. Górską M., Daroń M.: Doskonalenie systemu zarządzania jakością w procesie kompletowania zamówień, Logistyka nr 6/2012 r., s 85-89, (CD nr 1).
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9. Kardas E.: The Application Of The OEE Method For The Assessment Of Blast Furnace Effectiveness, 29th International Conference on Metallurgy and Materials, May 20 - 22, 2020/Brno, Czech Republic, EU, CONFERENCE PROCEEDINGS, 2020 r., pp. 1315-1320.
10. Kardas E.: Analiza efektywności wykorzystania maszyn szlifierskich w przedsiębiorstwie produkcyjnym metodą OEE, *Wybrane Aspekty Inżynierii, Jakości i Bezpieczeństwa W Przedsiębiorstwach Produkcyjnych* pod red. A. Kawalek, D. Strycharskiej, Seria Monografie nr 62, Wydawnictwo Wydziału Inżynierii Produkcji i technologii Materiałów, Politechniki Częstochowskiej, Częstochowa 2016 r., str. 5-17.
11. Kardas E., Brožova S., Pustějovská P., Jursová J.: The evaluation of efficiency of the use of machine working time in the industrial company - case study, *Management Systems in Production Engineering*, 2017 r., Volume 25, Issue 4, pp 241-245.

LEARNING OUTCOMES

- › **EU1** The student knows the basic issues related to the principles, methods and tools of Lean Management.
- › **EU2** The student is able to apply the principles, methods and tools of Lean Management in practice.

TEACHING TOOLS

- › Lecture with the use of audiovisual aids.
- › Exercises - solving problem tasks with the help of the teacher.
- › E-learning platform of the Czestochowa University of Technology or other distance learning tools.

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

- › **F1.** Assessment of preparation for exercises.
- › **F2.** Assessment of the ability to apply the acquired knowledge during the exercises and project.
- › **P1.** Assessment of the mastery of the teaching material being the subject of classes - final 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	15	0,6
Test	2	0,08
Exam		
Total contact hours	47	1,88
Student's own work		
Getting acquainted with the indicated literature	5	0,2
Preparation for seminar		
Preparation for classes	7	0,28
Preparation for lab		
Project preparation	8	0,32
Consultation	2	0,08
Preparation for the test	6	0,24
Total student's own work	28	1,12

Total number of hours/ ECTS points for the course	75	3,0
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ADDITIONAL INFORMATION

Timetable of classes	https://wip.pcz.pl/studia/studia-podyplomowe
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_W02, K_W03, K_W07, K_W08, K_U04, K_U05, K_K03,	C1, C2	L1 - L4, C1 - C4, P1 - P15	P1
EU 2	K_W02, K_W03, K_W07, K_W08, K_U04, K_U05, K_K03,	C1, C2, C3	L1 - L4, C1 - C4, P1 - P15	F1, F2 P1

FORM OF ASSESSMENT - DETAILS

EU1 The student knows the basic issues related to the principles, methods and tools of Lean Management.

- › 2,0 The student does not know the basic principles, methods and tools of Lean Management.
- › 3,0 The student knows the basic issues related to the principles, methods and tools of Lean Management sufficiently.
- › 3,5 The student knows the basic principles, methods and tools of Lean Management sufficiently plus.
- › 4,0 The student knows the basic principles, methods and tools of Lean Management to a good degree.
- › 4,5 The student knows the basic issues related to the principles, methods and tools of Lean Management a good plus.
- › 5,0 The student knows the basic issues related to the principles, methods and tools of Lean Management. to a very good degree.

EU2 The student is able to apply the principles, methods and tools of Lean Management in practice.

- › 2,0 The student is not able to apply the principles, methods and tools of Le-an Management in practice.
- › 3,0 The student is able to apply the principles, methods and tools of Lean Management in practice sufficiently.
- › 3,5 The student is able to apply the principles, methods and tools of Lean Management in practice sufficiently plus.
- › 4,0 The student is able to apply the principles, methods and tools of Lean Management in practice to a good degree.
- › 4,5 The student is able to apply the principles, methods and tools of Lean Management in practice a good plus.
- › 5,0 The student is able to apply the principles, methods and tools of Lean Management in practice to a very good degree.

Course name in Polish	JĘZYK OBCY (ANGIELSKI)
Course name in English	FOREIGN LANGUAGE (ENGLISH)
Course code	WIP-MDL-D1-FL-06
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	6
ECTS	2
Method of assessment	Exam

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
		30		

TEACHERS:

Katarzyna Stefańczyk, MA
Wioletta Będkowska, MA
Joanna Dziurkowska, MA
Małgorzata Engelking, MA
Marian Gałkowski, MA
Aleksandra Glińska, MA
Katarzyna Górniak-Cierpień, MA
Dorota Imiołczyk, MA
Aneta Kot, MA
Izabela Mishchil, MA
Monika Nitkiewicz, MA
Barbara Nowak, MA
Joanna Pabjańczyk-Musialska, MA
Dominika Rachwalik, MA
Przemysław Załęcki, MA

COURSE OBJECTIVES:

- › **C1** Practising and developing the basic language skills (listening, speaking, reading, writing) necessary to function in an international working environment and in everyday life.
- › **C2** Learning the necessary general and specialised vocabulary related to the field of study.
- › **C3** Acquiring intercultural knowledge and skills.

REQUIRED KNOWLEDGE, SKILLS, COMPETENCES:

1. Command of a foreign language at the B1 level according to CEFR (the Common European Framework of Reference for Languages).
2. Ability to work independently and in a group.
3. Ability to use various sources of information, also in a foreign language.

COURSE CONTENT

CLASSES

- › **C1, C2** Lexical-grammatical structures. Communicative exercises - career plans; management and work styles.
 - › **C3, C4** Grammatical structures in business communication.
 - › **C5, C6** PLW*- Work skills – business correspondence: e-mail, job application.
 - › **C7, C8** PLW*-Functions: contracts, offers, finance.
 - › **C9, C10** Audio-visual coursework.
 - › **C11, C12** Specialised text.**
 - › **C13, C14** PLW*- financial management. Lexical exercises. Revision.
 - › **C15, C16** Achievement test I.
 - › **C17, C18** Advanced language structures- part 1. Describing production processes.
 - › **C19, C20** Lexical-grammatical structures. - part 2.
 - › **C21, C22** PLW* Work skills: Time management.
 - › **C23, C24** Functions: team work; job interview; personal qualities.
 - › **C25, C26** Specialised text.** Revision.
 - › **C27, C28** Achievement test II.
 - › **C29, C30** Exam preparation.
- *) PLW - Professional Language in the Workplace.

***) Topics of specialised texts closely related to the characteristics and scope of the field of study.

RESOURCE MATERIALS

1. K. Harding, L. Taylor: International Express- Intermediate, OUP 2019 r.
2. K. Harding, L. Taylor: International Express- Upper- Intermediate, OUP 2019 r.
3. D. Cotton, D. Falvey, S. Kent: Market Leader - Upper-Intermediate, Pearson 2016 r.
4. J. Kern: Career Paths - Mechanical Engineering, Express Publishing 2016 r.
5. I. Dubicka, M. O’Keeffe i inni: B1+ Business Partner, Pearson 2018 r.
6. M. Ibbotson: Engineering, Technical English for Professionals CUP 2021 r.
7. I. Dubicka, M. Rosenberg i inni: B2 Business Partner, Pearson 2018 r.
8. D. Bonamy: Technical English 3/4, Pearson 2013 r.

SUPPLEMENTARY RESOURCE MATERIALS

1. V. Hollet, J. Sydes: Tech Talk OUP 2011 r.
2. I. Williams: English for Science and Engineering, Thomson LTD 2001 r.
3. N. Briger, A. Pohl: Technical English Vocabulary and Grammar, Summertown Publishing 2002 r.
4. V. Evans, J. Dooley, K. Rodgers: Career Paths: Natural Resources II – Mining, Egis 2018 r.
5. M. Ibbotson: Cambridge English for Engineering, CUP 2021 r.
6. C. Lloyd, J. A. Frazier: Career Paths – Engineering, Express Publishing 2018 r.
7. Aplikacje specjalistyczne: Mechanical Engineering.
8. E. J. Williams: Presentations in English, Macmillan 2008 r.
9. J. Dooley, V. Evans: Grammarway 2,3,4, Express Publishing 1999 oraz inne podręczniki do gramatyki.
10. Dictionary of Contemporary English, Pearson Longman 2009 oraz inne słowniki.
11. M. Duckworth, J. Hughes: Business Result - Upper-Intermediate, OUP 2018 r.
12. S. Sopranzi: Flash on English for Mechanics, Electronics and Technical Assistance, Eli 2016 r.

LEARNING OUTCOMES

- › **EU1** The student is able to use a foreign language to the extent necessary to function in a professional environment and typical everyday life situations.
- › **EU2** The student is able to read and understand a popular science text related to his/her field of study.
- › **EU3** The student is able to prepare and deliver a presentation in a foreign language using multimedia.

TEACHING TOOLS

- › General and specialised language textbooks.
- › Purpose built exercises.
- › Audiovisual exercises, multimedia presentations.
- › Internet resources, CUT e-learning platform.
- › Professional dictionaries and online dictionaries.

METHOD OF ASSESSMENT (F- FORMATIVE, S- SUMMATIVE)

- › **F1.** Grade for class preparation.
- › **F2.** Grade for class participation.
- › **F3.** Grade for the achievement test.
- › **F4.** Grade for the presentation.
- › **F5.** Grade for assignments completed in e-learning mode.
- › **P1.** End-of-semester grade *
- › **P2.** Examination grade.

*) a prerequisite for obtaining an end-of-semester grade is receiving passing grades in all assignments and achievement tests.

STUDENT WORKLOAD

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

Projects		
End-of-semester assessment		
Examination	2	0,08
Total direct contact classes	32	1,28
Student's unassisted work		
Self-directed study of lectures		
Self-directed preparation for seminars		
Self-directed preparation for tutorials	6	0,24
Self-directed preparation for laboratories		
Self-directed preparation for projects		
Consultations	2	0,08
Preparation for the end-of-semester examination	10	0,4
Total student's unassisted work	18	0,72
Total student workload	50	2,0

SUPPLEMENTARY INFORMATION

Class times	Information on class times is available at the Office of the Centre for Foreign Languages and in USOS. Foreign language classes are held at the Centre for Foreign Languages at Czestochowa University of Technology, ul. Dąbrowskiego 69 as well as Moodle e-learning platform of Czestochowa University of Technology is used.
Consultation times	Information on consultations is provided to students during the first class of a given course, and is also placed on the website of the Centre for Foreign Languages - www.sjo.pcz.pl

MATRIX OF LEARNING OUTCOMES

Learning outcome	Reference of the given outcome to outcomes defined for the entire programme	Course objectives	Course content	Method of assessment
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EU1	K_W09, K_U01, K_U09, K_K04,	C1, C2, C3	C1 - C30	F1, F2, F3, F5, P1, P2
EU2	K_W09, K_U01, K_U09, K_K04,	C1, C2, C3	C11 - C12, C25 - C26	F2, F5, P1, P2
EU3	K_W09, K_U01, K_U09, K_K04,	C1, C2, C3	C29 - C30	F1, F4, F5

LEARNING OUTCOMES EVALUATION MATRIX

EU1 The student is able to use a foreign language to the extent necessary to function in a professional environment and typical everyday life situations.

- › 2,0 The student is not able to use a foreign language and use appropriate grammatical and lexical structures in a professional environment and typical everyday life situations in both written and oral form. The student's score in the achievement test is below 60%.
- › 3,0 The student is able to use the foreign language to a very limited extent, making numerous mistakes. The student scores between 60-75% in the test.
- › 3,5 A grade of 3,5 is given when the learning outcomes for a grade of 3,0 have been fully achieved, but the student has not fully acquired the learning outcomes for a grade of 4,0.
- › 4,0 The student is able to use the foreign language correctly but occasionally makes mistakes. The student scores between 80-85% in the test.
- › 4,5 A grade of 4,5 is given when the learning outcomes for a grade of 4,0 have been fully achieved, but the student has not fully acquired the learning outcomes for a grade of 5,0.
- › 5,0 The student is able to express himself/herself fluently and spontaneously on professional and social topics and in social interactions. The student's score in the achievement test is above 91%.

EU2 The student is able to read and understand a popular science text related to his/her field of study.

- › 2,0 The student is not able to understand a popular science text he/she reads. The student's score in the reading comprehension test is below 60%.
- › 3,0 The student understands only excerpts from the text he/she reads and has difficulty interpreting it. The student scores between 60-75% in the reading comprehension test.
- › 3,5 A grade of 3,5 is given when the learning outcomes for a grade of 3,0 have been fully achieved, but the student has not fully acquired the learning outcomes for a grade of 4,0.
- › 4,0 The student understands the meaning of the main topics of the text and is able to interpret them. The student scores between 80-85% in the reading comprehension test.
- › 4,5 A grade of 4,5 is given when the learning outcomes for a grade of 4,0 have been fully achieved, but the student has not fully acquired the learning outcomes for a grade of 5,0.
- › 5,0 The student understands everything he/she reads, including details. He/she is able to accurately interpret the text in his/her own words. The student's score in the reading comprehension test is above 91%.

EU 3 The student is able to prepare and deliver a presentation in a foreign language using multimedia.

- › 2,0 The student is not able to prepare and deliver a presentation on a given topic.
- › 3,0 The student is able to prepare a presentation according to the established standards and deliver it but makes numerous language mistakes.
- › 3,5 A grade of 3,5 is given when the learning outcomes for a grade of 3,0 have been fully achieved, but the student has not fully acquired the learning outcomes for a grade of 4,0.
- › 4,0 The student is able to prepare a presentation according to the established standards and deliver it in a clear and communicative manner.
- › 4,5 A grade of 4,5 is given when the learning outcomes for a grade of 4,0 have been fully achieved, but the student has not fully acquired the learning outcomes for a grade of 5,0.
- › 5,0 The student is able to prepare a presentation according to the established standards and deliver it using rich lexis and advanced language and grammatical structures.

Course name in Polish	JĘZYK OBCY (NIEMIECKI)
Course name in English	FOREIGN LANGUAGE (GERMAN)
Course code	WIP-MDL-D1-FL-06
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	6
ECTS	2
Method of assessment	Exam

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
		30		

TEACHERS:

Mgr Henryk Juszcak,
Dr Marlena Wilk.

COURSE OBJECTIVES:

-
- › **C1** Practising and developing the basic language skills (listening, speaking, reading, writing) necessary to function in an international working environment and in everyday life.
 - › **C2** Learning the necessary general and specialised vocabulary related to the field of study.
 - › **C3** Acquiring intercultural knowledge and skills.

REQUIRED KNOWLEDGE, SKILLS, COMPETENCES:

1. Command of a foreign language at the B1 level according to CEFR (the Common European Framework of Reference for Languages).
2. Ability to work independently and in a group.
3. Ability to use various sources of information, also in a foreign language.

COURSE CONTENT

CLASSES

- › **C1, C2** Lexical - grammatical structures. Communicative exercises - career plans, management and work styles.
 - › **C3, C4** Grammatical structures in business communication.
 - › **C5, C6** PLW* Work skills - business correspondence: e-mail, job application.
 - › **C7, C8** PLW* Functions: contracts, offers, finance.
 - › **C9, C10** Audio-visual coursework.
 - › **C11, C12** Specialised text.**
 - › **C13, C14** PLW* Financial management. Lexical exercises. Revision.
 - › **C15, C16** Achievement test I.
 - › **C17, C18** Advanced language structures - part 1. Describing production processes.
 - › **C19, C20** Lexical-grammatical structures - part 2.
 - › **C21, C22** PLW* Work skills: Time management.
 - › **C23, C24** Functions: team work, job interview, personal qualities.
 - › **C25, C26** Specialised text.** Revision.
 - › **C27, C28** Achievement test II.
 - › **C29, C30** Exam preparation.
- *) PLW - Professional Language in the Workplace.

***) Topics of specialised texts closely related to the characteristics and scope of the field of study.

RESOURCE MATERIALS

1. Fügert N., Grosser R., DaF im Unternehmen B1, Kurs - und Übungsbuch, Klett, 2016 r.
2. Hagner V., Schlüter S., Im Beruf neu, Hueber Verlag, 2021 r.
3. Braunert J., Schlenker W., Unternehmen Deutsch, E. Klett, Stuttgart, 2014 r.
4. Sander I., Braun B., Doubek M., DaF Kompakt D, Klett, Stuttgart, 2015 r.
5. Hilper, S., Kalender S., Kerner M., Schritte international 5, Hueber, 2012 r.
6. Guenat G., Hartmann P., Deutsch für das Berufsleben B1, E. Klett Sprachen GmbH, 2015 r.
7. Braun-Podeschwa J., Habersack Ch., Pude A., Menschen, Huber, 2018 r.
8. Funk H, Kuhn Ch., Studio B1 + kurs DVD, Cornelsen BC edu, Berlin 2012 r.
9. Bosch G., Dahmen K., Schritte international, Hueber Verlag, Ismaning, 2012 r.

10. Eismann V., Erfolgreich bei Präsentationen, Cornelsen Verlag, Berlin 2016 r.
11. R.Kärchner-Ober, Deutsch für Ingenieure B1-B2, Hueber, Warszawa 2015 r.
12. Baberadova H., Język niemiecki w ekonomii: Fremdsprache Deutsch – Finanzen B2/C1, LektorKlett, 2012 r.

SUPPLMENTARY RESOURCE MATERIALS

1. Wielki Słownik niemiecko-polski/polsko-niemiecki PONS, LektorKlett, Kraków 2010 r.
2. Corbbeil J.-C., Archambault A., Słownik obrazkowy polsko-niemiecki, Klett, Poznań 2007 r.
3. Tarkiewicz U., Deutsche Fachtexte leichter gemacht, Wydawnictwa PCz, Częstochowa 2009 r.
4. Wyszzyński J., Sehen, Hören, Verstehen – Ćwiczenia do materiałów audiowizualnych, Wyd. Politechniki Częstochowskiej, Częstochowa 2008 r.
5. Czasopisma: magazin-deutschland.de, Bildung&Wissenschaft.
6. Słowniki mono i bilingwalne, również on-linowe.
7. Aplikacje specjalistyczne oraz zasoby Internetu.

LEARNING OUTCOMES

- › **EU1** The student is able to use a foreign language to the extent necessary to function in a professional environment and typical everyday life situations.
- › **EU2** The student is able to read and understand a popular science text related to his/her field of study.
- › **EU3** The student is able to prepare and deliver a presentation in a foreign language using multimedia.

TEACHING TOOLS

- › General and specialised language textbooks.
- › Purpose built exercises.
- › Audiovisual exercises, multimedia presentations.
- › Internet resources, CUT e-learning platform.
- › Professional dictionaries and online dictionaries.

METHOD OF ASSESSMENT (F- FORMATIVE, S- SUMMATIVE)

- › **F1.** Grade for class preparation.
- › **F2.** Grade for class participation.
- › **F3.** Grade for the achievement test.
- › **F4.** Grade for the presentation.
- › **F5.** Grade for assignments completed in e-learning mode.
- › **P1.** End-of-semester grade *
- › **P2.** Examination grade.

*) a prerequisite for obtaining an end-of-semester grade is receiving passing grades in all assignments and achievement tests.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures		
Seminars		
Classes	30	1,2
Laboratories		
Projects		
End-of-semester assessment		
Examination	2	0,08
Total direct contact classes	32	1,28
Student's unassisted work		
Self-directed study of lectures		
Self-directed preparation for seminars		
Self-directed preparation for tutorials	6	0,24
Self-directed preparation for laboratories		
Self-directed preparation for projects		
Consultations	2	0,08
Preparation for the end-of-semester assessment/examination	10	0,4
Total student's unassisted work	18	0,72
Total student workload	50	2,0

SUPPLEMENTARY INFORMATION

Class times	Information on class times is available at the Office of the Centre for Foreign Languages and in USOS. Foreign language classes are held at the Centre for Foreign Languages at Czestochowa University of Technology, ul. Dąbrowskiego 69 as well as Moodle e-learning platform of Czestochowa University of Technology is used.
Consultation times	Information on consultations is provided to students during the first class of a given course, and is also placed on the website of the Centre for Foreign Languages - www.sjo.pcz.pl

MATRIX OF LEARNING OUTCOMES

Learning outcome	Reference of the given outcome to outcomes defined for the entire programme	Course objectives	Course content	Method of assessment
EU1	K_W09, K_U01, K_U09, K_K04,	C1, C2, C3	C1 - C30	F1, F2, F3, F5, P1, P2
EU2	K_W09, K_U01, K_U09, K_K04,	C1, C2, C3	C11 - C12, C25 - C26	F2, F5, P1, P2
EU3	K_W09, K_U01, K_U09, K_K04,	C1, C2, C3	C29 - C30	F1, F4, F5

LEARNING OUTCOMES EVALUATION MATRIX

EU1 The student is able to use a foreign language to the extent necessary to function in a professional environment and typical everyday life situations.

- › 2,0 The student is not able to use a foreign language and use appropriate grammatical and lexical structures in a professional environment and typical

everyday life situations in both written and oral form. The student's score in the achievement test is below 60%.

- › 3,0 The student is able to use the foreign language to a very limited extent, making numerous mistakes. The student scores between 60-75% in the test.
- › 3,5 A grade of 3,5 is given when the learning outcomes for a grade of 3,0 have been fully achieved, but the student has not fully acquired the learning outcomes for a grade of 4,0.
- › 4,0 The student is able to use the foreign language correctly but occasionally makes mistakes. The student scores between 80-85% in the test.
- › 4,5 A grade of 4,5 is given when the learning outcomes for a grade of 4,0 have been fully achieved, but the student has not fully acquired the learning outcomes for a grade of 5,0.
- › 5,0 The student is able to express himself/herself fluently and spontaneously on professional and social topics and in social interactions. The student's score in the achievement test is above 91%.

EU2 The student is able to read and understand a popular science text related to his/her field of study.

- › 2,0 The student is not able to understand a popular science text he/she reads. The student's score in the reading comprehension test is below 60%.
- › 3,0 The student understands only excerpts from the text he/she reads and has difficulty interpreting it. The student scores between 60-75% in the reading comprehension test.
- › 3,5 A grade of 3,5 is given when the learning outcomes for a grade of 3,0 have been fully achieved, but the student has not fully acquired the learning outcomes for a grade of 4,0.
- › 4,0 The student understands the meaning of the main topics of the text and is able to interpret them. The student scores between 80-85% in the reading comprehension test.
- › 4,5 A grade of 4,5 is given when the learning outcomes for a grade of 4,0 have been fully achieved, but the student has not fully acquired the learning outcomes for a grade of 5,0.
- › 5,0 The student understands everything he/she reads, including details. He/she is able to accurately interpret the text in his/her own words. The student's score in the reading comprehension test is above 91%.

EU 3 The student is able to prepare and deliver a presentation in a foreign language using multimedia.

- › 2,0 The student is not able to prepare and deliver a presentation on a given topic.
- › 3,0 The student is able to prepare a presentation according to the established standards and deliver it but makes numerous language mistakes.
- › 3,5 A grade of 3,5 is given when the learning outcomes for a grade of 3,0 have been fully achieved, but the student has not fully acquired the learning outcomes for a grade of 4,0.
- › 4,0 The student is able to prepare a presentation according to the established standards and deliver it in a clear and communicative manner.
- › 4,5 A grade of 4,5 is given when the learning outcomes for a grade of 4,0 have been fully achieved, but the student has not fully acquired the learning outcomes for a grade of 5,0.
- › 5,0 The student is able to prepare a presentation according to the established standards and deliver it using rich lexis and advanced language and grammatical structures.

Polish course name	TECHNOLOGIE SZYBKIEGO PROTOTYPOWANIA
English course name	RAPID PROTOTYPING TECHNOLOGIES
Course code	WIP-MDL-D1-RPT-06
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	6
Number of ECTS points	5
Ways of assessment	Test

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
30			15	15

TEACHERS:

Dr hab. inż. Piotr Szota, prof. PCz.,

Dr inż. Andrzej Stefanik,

Dr hab. inż. Andrzej Zyska, prof. PCz.,

Dr hab. inż. Konrad Laber, prof. PCz.

COURSE OBJECTIVES:

- › **C1** Providing students with knowledge in the field of rapid prototyping technology.
- › **C2** Gaining by students the ability to prepare models for rapid prototyping.
- › **C3** Acquiring by the students the skills to make an element with the use of rapid prototyping technology.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Knowledge of algebra, geometry, trigonometry and programming at the high school level.
2. The student has a basic knowledge of materials science.
3. Knowledge of technical drawing and creating technical documentation.

4. Basic ability to use a CAD program and spreadsheets.

COURSE CONTENT

LECTURE

- › **L1, L2** Introduction to rapid prototyping technology.
- › **L3 - L6** Fundamentals of additive manufacturing.
- › **L7 - L10** Basics of manufacturing technique with the use of subtractive processing.
- › **L11 - L14** Incremental shaping technology.
- › **L15 - L18** Coding of CNC devices and 3D printers.
- › **L19, L20** Materials and techniques used in 3D printing technology.
- › **L21, L22** The use of CNC machine tools for rapid prototyping.
- › **L23, L24** Rapid prototyping with the use of ceramic materials.
- › **L25, L26** Application of rapid prototyping techniques in foundry.
- › **L27 - L30** Model and mold technology, preparation of piece and series production.

LABOLATORY

- › **Lab1, Lab2** Preparation of object models in the CAD program.
- › **Lab3, Lab4** Designing assemblies of elements and their cooperation.
- › **Lab5** Possibilities, use and limitations of 3D scanning techniques.
- › **Lab6** Coding of CNC devices and 3D printers.
- › **Lab7** Printing parameters in the context of the materials used for 3D printing.
- › **Lab8, Lab9** Fabrication of component models with the use of 3D printers.
- › **Lab10** Getting to know the CAM environment - virtualization of machine tool operation.
- › **Lab11, Lab12** Manufacturing of component models with the use of CNC machine tools.
- › **Lab13, Lab14** Preparation of models and molds for rapid prototyping of ceramic materials.
- › **Lab15** Research on the mechanical and technological properties of model and molding core sands used in foundry rapid prototyping methods.

PROJECT

- › **P1 - P4** Development of the project for the assembly of cooperating elements and verification of the project with the use of 3D printing technology.

- › **P5 - P8** Development of a CAD model of a selected element and preparation of a CAM project for a numerical machine tool.
- › **P9 - P12** Development of prototyping technology for the production of prototype elements from ceramic materials.
- › **P13 - P15** Application of rapid prototyping techniques in the design of foundry models, molds and tooling. Preparation of object models in the CAD program.

BASIC REFERENCES

1. France A.K., Świat druku 3D, Helion, 2014 r.
2. Kwapisz M., Charakterystyka Metod druku 3D, Inżynieria Zarządzania Cyfryzacja Produkcji, Aktualności badawcze 1, Warszawa 2019 r.
3. User Manuals XYZprinting da Vinci 1.0 Pro 3in1 [2019] www.xyzprinting.com/.
4. Gebhardt A., Rapid Prototyping, Carl Hanser Verlag, Munich – 2007 r.
5. Augustyn K., EdgeCAM - Komputerowe wspomaganie wytwarzania, Helion, Gliwice 2007 r.
6. K. E. Oczóś, Intensywna ekspansja rapid-technologii, Mechanik, 7/2007, 539 - 545.
7. K. E. Oczóś, Rosnące znaczenie Rapid Manufacturing w przyrostowym kształtowaniu wyrobów, Mechanik 4/2008, 241 - 257.
8. Bubicz M., Szybkie prototypowanie. Maszyny, materiały zastosowania, Projektowanie i konstrukcje inżynierskie nr 4/2008.
9. Miecielica M., Techniki szybkiego prototypowania – rapid prototyping, Przegląd Mechaniczny nr 2/2010.
10. Chlebus Edward red., i inni, Innowacyjne technologie rapid prototyping-rapid tooling w rozwoju produktu, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław, 2003 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. Chlebus Edward red., i inni, Innowacyjne technologie rapid prototyping-rapid tooling w rozwoju produktu, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław, 2003 r.
2. Bubicz M., Szybkie prototypowanie, Maszyny, materiały zastosowania, Projektowanie i konstrukcje inżynierskie nr 4/2008.

LEARNING OUTCOMES

- › **EU1** The student has knowledge of the use of incremental methods in high-speed manufacturing technology and is able to use programming environments.
- › **EU2** The student has the knowledge of innovative/advanced techniques for the production of models, semi-finished products and finished products from polymer, metal and ceramic materials.
- › **EU3** The student is able to design and implement the process of rapid prototyping of the model, semi-finished product, and ready element using the selected technique, and to assess the material and geometric quality of the detail obtained.

TEACHING TOOLS

- › Lecture with the use of audiovisual aids.
- › Design exercises with the use of computer stations with the required CAD / CAM software, 3D printer, CNC machine tool, stations for manufacturing elements using casting techniques.
- › E-learning platform of the Czestochowa University of Technology or other distance learning.

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

- › **F1** Assessment of the implementation of tasks included in the curriculum.
- › **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 lectures - final test.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures	30	1,2
Seminar		
Classes		
Laboratory	15	0,6
Project	15	0,6

Test	2	0,08
Exam		
Total contact hours	62	2,48
Student's own work		
Getting acquainted with the indicated literature	20	0,8
Preparation for seminar		
Preparation for classes		
Preparation for lab	15	0,6
Project preparation	15	0,6
Consultation	3	0,12
Preparation for the test	10	0,4
Total student's own work	63	2,52
Total number of hours/ ECTS points for the course	125	5,0

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_W02, K_W05, K_W06, K_U01, K_U02, K_U05, K_K01, K_K02,	C1	L1 - L30	P1
EU 2	K_W02, K_W05, K_W06, K_U01,	C2	Lab1 - Lab15	F1, F2

	K_U02, K_U05, K_K01, K_K02,			
EU 3	K_W02, K_W05, K_W06, K_U01, K_U02, K_U05, K_K01, K_K02,	C3	P1 - P15	F1, F2

FORM OF ASSESSMENT - DETAILS

EU1 The student has knowledge of the use of incremental methods in rapid production technology and is able to use programming environments.

- › 2,0 The student has no knowledge of the use of incremental methods in the rapid production technology and is able to use programming environments.
- › 3,0 The student has a basic knowledge of the use of incremental methods in the rapid production technology and has difficulties with independent use of the programming environment.
- › 3,5 The student has knowledge of the use of incremental methods in the rapid production technology and has difficulties with the use of the programming environment.
- › 4,0 The student has knowledge of the use of incremental methods in high-speed manufacturing technology and is able to use programming environments.
- › 4,5 The student has extensive knowledge of the use of incremental methods in fast production technology and is able to use advanced programming environments.
- › 5,0 The student has extensive knowledge of the use of incremental methods in rapid production technology and is able to use programming environments at an advanced level and shows his own solutions.

EU2 The student has the knowledge of innovative/advanced techniques for the production of models, semi-finished products and finished products from polymer, metal and ceramic materials.

- › 2,0 The student has no knowledge of innovative/advanced techniques for the production of models, semi-finished products and finished products from polymer, metal and ceramic materials.

- › 3,0 The student has basic knowledge in the field of innovative/advanced techniques for the production of models, semi-finished products and finished products from polymer, metal and ceramic materials.
- › 3,5 The student has quite good knowledge in the field of innovative/advanced techniques for the production of models, semi-finished products and finished products from polymer, metal and ceramic materials.
- › 4,0 The student has good knowledge in the field of innovative/advanced techniques for the production of models, semi-finished products and finished products.
- › 4,5 The student has a good plus knowledge in the field of innovative/advanced techniques of producing models, semi-finished products and finished products, is able, with the help of the teacher, to choose a polymer, metal or ceramic material depending on the intended use.
- › 5,0 The student has very good knowledge in the field of innovative/advanced techniques of producing models, semi-finished products and finished products

EU3 The student is able to design and implement the process of rapid prototyping of a model, semi-finished product, and ready-made element using the selected technique, and to assess the material and geometric quality of the obtained detail.

- › 2,0 The student is not able to design and implement the process of rapid prototyping of the model, semi-finished product, and ready element using the selected technique, and to assess the material and geometric quality of the detail obtained.
- › 3,0 The student is able to sufficiently design and implement the process of rapid prototyping of the model, semi-finished product, and finished element using the selected technique, and can evaluate the material and geometric quality of the detail obtained.
- › 3,5 The student is able to quite well design and implement the process of rapid prototyping of a model, semi-finished product, and a finished element using the selected technique, and can evaluate the material and geometrical quality of the obtained detail.
- › 4,0 The student is able to design and implement the process of rapid prototyping of a model, semi-finished product, and a finished element using the selected technique, and can evaluate the material and geometric quality of the detail obtained.

- › 4,5 The student is able to design and implement the process of rapid prototyping of a model, semi-finished product, and finished element with the use of a selected technique, and to assess the material and geometric quality of the obtained detail.
- › 5,0 The student is able to very well design and implement the process of rapid prototyping of a model, semi-finished product, and a finished element using the selected technique, and to assess the material and geometric quality of the detail obtained.

Polish course name	PROJEKTOWANIE I DOBÓR MATERIAŁÓW
English course name	DESIGN AND MATERIALS SELECTION
Course code	WIP-MDL-D1-DAMS-06
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	6
Number of ECTS points	4
Ways of assessment	Test

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
30			30	

TEACHERS:

Dr inż. Paweł Wieczorek.

COURSE OBJECTIVES:

- › **C1** Providing students with knowledge in the field of design and materials selection.
- › **C2** Obtaining by the students the practical skills in the field of design and materials selection.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Basic knowledge of materials science and materials properties.
2. Ability to work independently and in a group.
3. Ability to use literature and internet sources.

COURSE CONTENT

LECTURE

- › **L1** Design process: function, material, shape and technology.
- › **L2** Classification of materials used in engineering practice and their properties.
- › **L3** Methods of presenting the properties of material.

- › **L4** Materials indices.
- › **L5** Procedure determining for materials indices without shape factor.
- › **L6** Materials indicators with shape factor.
- › **L7** Selection of manufacturing technology, joining and surface treatment.
- › **L8** Economical aspects of choice of technology depending on the batch size.
- › **L9** Ecological and environmental aspects of selection.
- › **L10** Golden rules of designing.
- › **L11** Obtaining of materials data during selection process.

LABORATORY

- › **Lab1** Introduction to CES Edu Pack.
- › **Lab2** Solving problems of material selection using property charts.
- › **Lab3** Determining functionality indicators.
- › **Lab4** Selection of materials based on one design criterion.
- › **Lab5** Multi-criteria determination of functionality and material selection indicators.
- › **Lab6** Determination of functionality indicators taking into account the shape of the finished product.
- › **Lab7** Selection of methods and processes of manufacturing products, taking into account the bath size of production.

BASIC REFERENCES

1. M. F. Ashby, Dobór materiałów w projektowaniu inżynierskim, WNT, Warszawa, 1998 r.
2. M. Ashby, H. Shercliff, D. Cebon, Inżynieria materiałowa, Wydawnictwo Galaktyka, Łódź 2011 r.
3. L.A. Dobrzański, Wprowadzenie do nauki o materiałach, Wydawnictwo Politechniki Śląskiej, Gliwice 2007 r.
4. M. F. Ashby, D.R.H. Jones, Materiały inżynierskie, właściwości i zastosowania, WNT, Warszawa, 1995 r.
5. L.A. Dobrzański, Materiały inżynierskie i projektowanie materiałowe. Podstawy nauki o materiałach i metaloznawstwo, Wydawnictwo Naukowo-Techniczne, Warszawa 2006 r.
6. M. Ashby, Materials Selection i materials design; third edition, 2005 r., Butterwirth&Hainemann.

SUPPLEMENTARY REFERENCE MATERIALS

1. Lacki P., Więckowski W., Luty G., Wieczorek P., Motyka M., Evaluation of Usefulness of AlCrN Coatings for Increased Life of Tools Used in Friction Stir Welding (FSW) of Sheet Aluminum Alloy, Materials, vol. 13 iss. 18, 2020 r.
2. Golański G., Merda A., Wieczorek P., Klimaszewska K., Metody badania wybranych właściwości mechanicznych materiałów metalowych i ich złączy spawanych - Politechnika Częstochowska, 2021 r.

LEARNING OUTCOMES

- › **EU1** Student has basic theoretical knowledge in the field of design and materials selection.
- › **EU2** Student is able to practical use knowledge in the field of design and materials selection.

TEACHING TOOLS

- › Multimedia presentations.
- › Laboratory equipment, CES software.

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

- › **F1.** Assessment of preparation for exercises.
- › **F2.** Assessment of the ability to apply the acquired knowledge during exercises.
- › **P1.** Assessment of the mastery of the teaching material being the subject of exercises - 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	15	0,6
Preparation for seminar		
Preparation for classes		
Preparation for lab	15	0,6
Project preparation		
Consultation	4	0,18
Preparation for the test	6	0,24
Total student's own work	40	1,6
Total number of hours/ ECTS points for the course	100	4,0

ADDITIONAL INFORMATION

Timetable of classes	https://wip.pcz.pl/dla-studentow
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_W03,	C1	L1 - L11	P1
EU 2	K_W03, K_U09, K_K02,	C2	Lab1 – Lab7	F1, F2

FORM OF ASSESSMENT - DETAILS

EU1 Student has basic theoretical knowledge in the field of design and materials selection.

- › 2,0 The student has not any basic knowledge in the field of design and materials selection.

- › 3,0 The student has a basic knowledge in the field of design and materials selection.
- › 3,5 The student has a little more than basic knowledge in the field of design and materials selection.
- › The student has a basic knowledge in the field of design and materials selection and is able to characterize a goal with their use at good level.
- › 4,5 The student has a basic knowledge in the field of design and materials selection and is able to characterize a goal with their use at almost perfect level.
- › 5,0 The student has a basic knowledge in the field of design and materials selection and is able to characterize a goal with their use at perfect level.

EU2 Student is able to practical use knowledge in the field of design and materials selection.

- › 2,0 The student is no able to practice use knowledge of the design and materials selection.
- › 3,0 The student has only a basic practical knowledge of the design and materials selection.
- › 3,5 The student has an almost good practice knowledge of the design and materials selection.
- › 4,0 The student correctly uses the knowledge and solves the problems of the design and materials selection.
- › 4,5 The student has almost very well mastered the practical knowledge of the design and materials selection.
- › 5,0 The student has mastered the practical knowledge of the design and materials selection.

Polish course name	EFEKTYWNOŚĆ FUNKCJONOWANIA ORGANIZACJI
English course name	THE EFFICIENCY OF THE ORGANIZATION'S FUNCTIONING
Course code	WIP-MDL-D1-TEOTO-06
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	6
Number of ECTS points	3
Ways of assessment	colloquium

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15		15		

TEACHERS:

Dr hab. inż. Rafał Prusak, prof. PCz.,

Dr inż. Edyta Kardas,

Dr inż. Monika Górńska.

COURSE OBJECTIVES:

- › **C1** Providing students with knowledge about the effectiveness of the organization's functioning.
- › **C2** To acquaint students with the basic measures used to assess the effectiveness of the organization.
- › **C3** Acquiring by the student the ability to use the equivalent of measures to assess the effectiveness of the organization.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Basic knowledge of economics and management and production processes.
2. Ability to work independently and in a group.
3. Ability to use literature sources and internet resources.

COURSE CONTENT

LECTURE

- › **L1, L2** Introduction to the issues of the effectiveness of the functioning of an organization.
- › **L3 - L5** Characteristics of various approaches to the analysis and evaluation of the effectiveness of the organization's functioning.
- › **L6 - L8** Methods of assessing the effectiveness of the organization's functioning
- › **L9 - L12** Methods of improving the effectiveness of the organization's functioning.
- › **L13** Instruments for measuring production efficiency.
- › **L14, L15** Methods and techniques of production organization used to improve the efficiency of the enterprise.

CLASSES

- › **C1, C2** Acquainting students with the rules of passing the course. Introduction to exercises.
- › **C3 - C8** Application of selected methods and tools to assess the functioning of an organization.
- › **C9, C10** Difficulties in measuring and assessing the effectiveness of the organization's functioning.
- › **C11 - C13** Efficiency improvement programs.
- › **C14, C15** Case study analysis and discussion.

BASIC REFERENCES

1. M. Bednarek: Doskonalenie systemów zarządzania. Nowa droga do przedsiębiorstwa lean, Difin, Warszawa 2007 r.
2. J. Czerska: Doskonalenie strumienia wartości, Difin, Warszawa 2009 r.
3. K. Dohn: Studium oceny procesu produkcyjnego w przedsiębiorstwie przemysłowym, Wydawnictwo Politechniki Śląskiej, Gliwice 2006 r.
4. Kosieradzka A. (red): Podstawy zarządzania produkcją. Ćwiczenia, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2016 r.

5. A. Kosieradzka, S. Lis: Produktywność. Metody analizy i oceny tworzenia programów popraw, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2000 r.
6. A. Więznowski, M. Sosnowski, P. Szlachetka: Analiza i optymalizacja procesów produkcyjnych i usług, Wydawnictwo AE we Wrocławiu, Wrocław 2007 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. S. Borkowski, J. Selejdak, S. Salamon: Efektywność eksploatacji maszyn i urządzeń, Politechnika Częstochowska, Częstochowa 2006 r.
2. Durlik: Inżynieria Zarządzania, Placet, Warszawa 2004 r.
3. S. Borkowski, R. Ulewicz: Zarządzanie produkcją. Systemy produkcyjne, Oficyna Wydawnicza Humanitas, Sosnowiec 2008 r.

TEACHING TOOLS

- › Lecture with the use of audiovisual aids.
- › Exercises - solving problem tasks with the help of the teacher.
- › E-learning platform of the Częstochowa University of Technology or other distance learning tools.

LEARNING OUTCOMES

- › **EU1** The student knows the basic issues related to the assessment of the effectiveness of the organization's functioning.
- › **EU2** The student is able to measure and evaluate the effectiveness of the organization in practice.

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

- › **F1.** Assessment of preparation for exercises.
- › **F2.** Assessment of the ability to apply the acquired knowledge during the exercises.
- › **P1.** Assessment of the mastery of the teaching material being the subject of classes - final test.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
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Contact hours with the teacher		
Lectures	15	0,6
Seminar		
Classes	15	0,6
Laboratory		
Project		
Test	2	0,08
Exam		
Total contact hours	32	1,28
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	2	0,08
Preparation for the test	11	0,44
Total student's own work	43	1,72
Total number of hours/ ECTS points for the course	75	3,0

ADDITIONAL INFORMATION

Timetable of classes	https://wip.pcz.pl	
Information about the consultation (time + place)	https://wip.pcz.pl	

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,	C1, C2	L1 - L15	P1

	K_W03, K_W07, K_W08, K_U04, K_U05, K_K03,			
EU 2	K_W02, K_W03, K_W07, K_W08, K_U04, K_U05, K_K03,	C1, C2, C3	C1 - C15	F1, F2 P1

FORM OF ASSESSMENT - DETAILS

EU1 The student knows the basic issues related to the assessment of the effectiveness of the functioning of the organization.

- › 2,0 The student does not know the basic issues related to the assessment of the effectiveness of the organization.
- › 3,0 The student knows the basic issues related to the assessment of the effectiveness of the organization's functioning to a sufficient degree.
- › 3,5 The student knows the basic issues related to the assessment of the effectiveness of the organization's functioning to a sufficiently plus degree.
- › 4,0 The student knows the basic issues related to the assessment of the effectiveness of the organization's functioning to a good degree.
- › 4,5 The student knows the basic issues concerning the assessment of the effectiveness of the organization's functioning to a positive degree.
- › 5,0 The student knows the basic issues related to the assessment of the effectiveness of the organization's functioning to a very good degree.

EU2 The student is able to measure and evaluate the effectiveness of the organization in practice.

- › 2,0 The student is not able to measure and evaluate the effectiveness of the organization in practice.

- › 3,0 The student is able to measure and evaluate the effectiveness of the organization's functioning in practice to a sufficient degree.
- › 3,5 The student is able to measure and evaluate the effectiveness of the organization in practice to a sufficiently plus degree.
- › 4,0 The student is able to measure and evaluate the effectiveness of the organization to a good degree in practice.
- › 4,5 The student is able to measure and evaluate the effectiveness of the organization's functioning in practice to a positive degree.
- › 5,0 The student is able to measure and evaluate the effectiveness of the organization's functioning in practice to a very good degree.

Polish course name	TECHNOLOGIE INFORMACYJNO - KOMUNIKACYJNE W LOGISTYCE
English course name	INFORMATION AND COMMUNICATION TECHNOLOGIES IN LOGISTICS
Course code	WIP-MDL-D1-IACT-06
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	6
Number of ECTS points	2
Ways of assessment	Test

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15		15		

TEACHERS:

Dr inż. Dariusz Dudek.

COURSE OBJECTIVES:

- › **C1** Familiarizing students with the possibilities of using information and communication technologies and indicating the role of information systems in the area of logistics.
- › **C2** Preparing the student to use information and communication technologies in solving logistic problems with the use of utility applications.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Skills in the use of information and communication technologies at the basic level.
2. Ability to work independently and in a group.
3. Ability to use literature sources and internet resources.

COURSE CONTENT

LECTURE

- › **L1** Introduction to the subject matter. Requirements and aims of classes. Information system and management system in the enterprise.
- › **L2** Information and communication technologies in the processes of processing, collecting and transmitting information.
- › **L3, L4** Characteristics of the use of information and communication solutions in logistics.
- › **L5** The role of information in modern companies implementing logistic processes.
- › **L6** Elements of IT system management in logistics.
- › **L7, L8** The role of IT systems and tools for the effective functioning of logistics companies.
- › **L9 - L11** IT systems supporting logistic processes.
- › **L12** Modern ICT solutions for logistics.
- › **L13** Information technologies in transport systems.
- › **L14** Logistics in shaping the value chain.
- › **L15** Information security management in logistics.

CLASSES

- › **C1** Organizational and introductory classes to the subject of the subject. Discussion of the goals and requirements for passing the exam, the rules for performing the exercises and getting acquainted with the rules of the computer laboratory.
- › **C2, C3** Text processing in solving logistic problems, creating documents.
- › **C4, C5** The use of sheet-fed applications to solve logistics problems.
- › **C6** Optimization issues with the use of a spreadsheet.
- › **C7, C8** Working with objects in creating interactive presentations.
- › **C9, C10** Applications of office software in a computing cloud in terms of use in a logistics company.
- › **C11** Operation of a database system in a computing cloud.
- › **C12** Implementation of the selected content management system.
- › **C13, C14** The content management system environment and methods of its creation.

- › **C15** Presentation of the website of the selected logistics company.

BASIC REFERENCES

1. Voght P.: Business Logistics Management. Oxford University Press Southern Africa, Cape Town 2017 r.
2. Szymonik A.: Informatyka dla potrzeb logistyka. Wydawnictwo Difin, Warszawa 2015 r.
3. Myerson P. A.: Supply Chain and Logistics Management Made Easy: Methods and Applications for Planning, Operations, Integration, Control and Improvement and Network Design, Pearson Education, Old Tappan NJ 2015 r.
4. Grudowski P., Dudek D., Majczyk J., Muchlado M.: Challenges in Management and Economics in 21st Century. Selected Studies and Examples. Gdansk University of Technology. Gdańsk 2020 r.
5. Dudek D.: Key Technologies in Supply Chain Management. [in] Dunay A.: (ed.) People, Planet and Profit: Sustainable Business and Society. Vol.2 (ICoM 2019), Hungary, Godollo 2019 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. Cichosz M.: Logistics Management: Szkoła Główna Handlowa, Warszawa 2015 r.
2. Mangan J., Lalwani Ch.: Global Logistic and Supply Chain Management. John Wiley and Sons, Chichester 2016 r.
3. Dudek D., Sałek R.: The Application and Development of Information Technologies in Logistic Management of Agricultural Farms. [in:] Brzozowska A., Kalinichenko A.: Transformation Management of Economic at Rural Areas (ed.). Poltava State Agrarian Academy. Poltava 2015 r.

LEARNING OUTCOMES

- › **EU1** Student has theoretical knowledge in the field of the key importance of information and communication technologies in logistics and system solutions supporting the organization of logistics processes in enterprises.
- › **EU2** Student is able to use application software to support logistic management.
- › **EU3** Student is able to use application software to independently create content and a website for a company from the logistics industry.

TEACHING TOOLS

- › Lecture with the use of a multimedia presentation, discussion.
- › Classes - problem discussion, practical exercises, project.
- › Computer stations with software, e-learning platform (possible use).

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

- › **F1.** Assessment of the implementation of tasks included in the curriculum.
- › **F2.** Activity in the classroom, the degree of mastering the teaching material being the subject of the tasks within the exercises.
- › **P1.** Assessment of the mastery of the teaching material within the lectures - quiz / test task.

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	6	0,24
Preparation for seminar		
Preparation for classes	5	0,2
Preparation for lab		
Project preparation		
Consultation	2	0,08
Preparation for the test	4	0,16
Total student's own work	17	0,68

Total number of hours/ ECTS points for the course	50	2,0
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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_U04, K_U05, K_U07, K_K01, K_K02,	C1	L1 - L15	P1
EU 2	K_W02, K_W07, K_U04, K_U05, K_U07, K_K02, K_K03,	C1, C2	C1 - C15	F1, F2
EU 3	K_W02, K_W07, K_U04, K_U05, K_U07, K_K02, K_K03,	C1, C2	C1 - C15	F1, F2

FORM OF ASSESSMENT – DETAILS

EU1 Student has theoretical knowledge in the field of the key importance of information and communication technologies in logistics and system solutions supporting the organization of logistics processes in enterprises.

- › 2,0 The student has no knowledge of the importance of information and communication technologies in logistics and is unable to indicate any system solutions supporting the organization of logistics processes in enterprises.
- › 3,0 The student has a partial knowledge of the importance of information and communication technologies in logistics and is able to indicate only some system solutions supporting the organization of logistic processes in enterprises.
- › 3,5 The student almost knows the basic meaning of information and communication technologies in logistics and is able to indicate selected system solutions supporting the organization of logistic processes in enterprises.
- › 4,0 The student knows well the importance of information and communication technologies in logistics and is able to indicate selected system solutions supporting the organization of logistic processes in enterprises.
- › 4,5 The student has full knowledge of the importance of information and communication technologies in logistics and is able to identify selected system solutions supporting the organization of logistic processes in enterprises.
- › 5,0 The student has full knowledge of the importance of information and communication technologies in logistics and can indicate all system solutions supporting the organization of logistics processes in enterprises.

EU2 Student is able to use application software to support logistic management.

- › 2,0 The student is not able to use the application software to support logistic management.
- › 3,0 The student is able to partially use the application software to support logistic management.
- › 3,5 The student is almost able to use the application software to support logistic management.
- › 4,0 The student is able to use the application software well to support logistic management.
- › 4,5 The student is able to use the application software to support logistic management almost very well.
- › 5,0 The student is very good at using the application software to support logistic management.

EU 3 Student is able to use application software to independently create content and a website for a company from the logistics industry.

- › 2,0 The student is not able to use the software to create a website of a logistics company.
- › 3,0 The student is able to partially use the software to create a website of a company from the logistics industry.
- › 3,5 The student is almost able to use the software to create a website of a company from the logistics industry.
- › 4,0 The student is able to use the software well to create a website of a company from the logistics industry.
- › 4,5 The student is able to use the software almost very well to independently create a website of a company from the logistics industry.
- › 5,0 The student is very good at using the software on his own to create a website of a company from the logistics industry.

Polish course name	ZARZĄDZANIE PROJEKTAMI LOGISTYCZNYMI
English course name	LOGISTICS PROJECT MANAGEMENT
Course code	WIP-MDL-D1-LPM-06
Field of study	MATERIALS DESIGN AND LOGISTICS
Level of qualification	First degree
Form of study	Full-time
Semester	6
Number of ECTS points	2
Ways of assessment	Test

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15				15

TEACHERS:

Dr inż. Nicoletta Baskiewicz.

COURSE OBJECTIVES:

C1 Providing students with knowledge in the field of project management methods implemented in all types of enterprises, especially logistics.

C2 Acquainting students with the techniques of preparing and running logistic projects, building a project team, creating schedules and project plans, as well as issues related to managing people in project management.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Knowledge of the basics of organization management.
2. Knowledge of economics.
3. Knowledge of personnel management.
4. Ability to work independently and in a group.
5. Ability to perform mathematical operations to solve given tasks.
6. Ability to prepare a report on the course of the exercise and project documentation.

COURSE CONTENT

LECTURE

- › **L1, L2** Introduction to logistics project management: history of logistics project management, the concept of a logistics project, types of projects and their importance for the organization, project goals.
- › **L3** Basic elements of logistics project management: knowledge areas of logistics project management, logistics project management system, forms and stages of project management, the essence of project and project management.
- › **L4** Project stakeholders.
- › **L5, L6** Characteristics of the project life cycle, success factors and reasons for the failure of a logistics project.
- › **L7** Presentation of groups of logistics project management processes: initiation and definition, planning, implementation, control, closing.
- › **L8, L9** Aim of the project - definition and characteristics. Project scope management process.
- › **L10, L11** Project time management process.
- › **L12, L13** Project cost management process.
- › **L14** Risk management in the project.
- › **L15** Logistics project closure: closure processes, project documentation, post-project reports.

PROJECT

- › **P1** Introduction to the subject matter, defining the logistics project and its characteristics.
- › **P2** Presentation of the rules for the implementation of the logistics project and discussion of the project plan.
- › **P3** Project start - Company selection and characteristics (basic information, employment and organizational structure).
- › **P4** Description of the scope of the company's activity and logistics processes taking place in it.
- › **P5, P6** Identification of the company's needs in the field of logistics projects. Study of the company's logistics system, mapping of logistics processes in the enterprise, best logistics practices, logistics benchmarking.

- › **P7** Identification of the purpose of the project. Diagnosis of the state of the enterprise and identification of the logistics process being the subject of design 1h.
- › **P8** Project stakeholders. Criteria of success, responsibility matrix, principles of working in the project.
- › **P9** Scope of the project. Logistics Project Planning: Work Breakdown Structure (WBS).
- › **P10** Constructing the project schedule. Planning project deadlines (task time estimation).
- › **P11, P12** Logistics project budgeting. Identifying the resources necessary to implement the project.
- › **P13** Risk assessment in the project. Project closure: closure processes, project documentation, final reports.
- › **P 14, P15** Presentations of logistics projects and their evaluation.

BASIC REFERENCES

1. Pisz I., Łapuńska I., Zarządzanie projektami w logistyce, Wydaw. Difin, Warszawa 2015 r.
2. Wojtynek L., Budzik R., Analiza ryzyka w projektowaniu i doskonaleniu procesów logistycznych, Logistyka nr 6, 2015 r.
3. Skowron-Grabowska B., Zarządzanie projektem logistycznym zgodnie ze standardami Project Management Institute (PMI), Wyzwania przedsiębiorczości. T.1 (red.) Kościelniak Helena, Sekcja wydawnictw WZPCZ., Częstochowa 2014 r.
4. Procesy i projekty logistyczne, pod red. St. Nowosielskiego, Wydaw. Uniwersytetu Ekonomicznego, Wrocław 2008 r.
5. Kasperek M, Metoda agile w zarządzaniu projektem logistycznym, Wydaw. Uniwersytetu Ekonomicznego, Katowice 2012 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. Blaik P., Logistyka. Koncepcja zintegrowanego zarządzania, PWE, Warszawa.
2. Pabian A., Kulturowe uwarunkowania planowania i organizowania projektu logistycznego przez jednostki kultury na rynkach zagranicznych, Biznes w kulturze – kultura w biznesie. Nowoczesne technologie informacyjno-komunikacyjne (red.) Reformat Beata, Kwiecień Anna, Wydawnictwo Uniwersytetu Ekonomicznego w Katowicach, Katowice 2017 r.

3. Baskiewicz N., Kempa E., Logistics Systems of Food Business Operating in Rural Areas, [w:] transformation Management of Economic art. Rural Areas (red, Brzozowska A, Kalinichenko A., Poltava State Agrarian Academy, 2015 r.
4. Baskiewicz N., The Use of MS Project as a Tool to Help Clarify the Scope of the Project as an Image of the Project's Objective Wydawnictwo Wydziału Zarządzania Politechniki Częstochowskiej, Częstochowa 2018 r.
5. Baskiewicz N., Łęgowski - Małolepsza M., The Use of MS Project in Planning the Project Implementation Time, Wydawnictwo Wydziału Zarządzania Politechniki Częstochowskiej, Częstochowa 2018 r.
6. John J. Coyle, Edward J. Bardi C. John Langley Jr., Zarządzanie Logistyczne, PWE, Warszawa 2010 r.

LEARNING OUTCOMES

EU1 The student is able to define and know the classification of logistics projects, additionally can indicate their importance for the organization and the basic elements of their management.

EU2 The student is able to characterize the project management process in organizations.

EU3 The student is able to construct a logistics project plan using the known planning techniques - Microsoft Project.

TEACHING TOOLS

- › Multimedia presentations.
- › Laboratory equipment and guides.
- › E-learning platform (possible use).
- › Computer stations with software.

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

F1. Assessment of the implementation of tasks included in the curriculum.

F2. Assessment of the mastery of the teaching material being the subject of project tasks.

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

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures	15	0,6
Seminar		
Classes		
Laboratory		
Project	15	0,6
Test		
Exam		
Total contact hours	30	1,2
Student's own work		
Getting acquainted with the indicated literature	12	0,48
Preparation for seminar		
Preparation for classes		
Preparation for lab		
Project preparation	6	0,24
Consultation	2	0,08
Preparation for the exam		
Total student's own work	20	0,8
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	Course objectives	Course content	Ways of assessment
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	outcomes defined for whole program			
EU 1	K_W06, K_W07, K_W08, K_W09, K_U04, K_U07, K_K02, K_K03,	C1	L1 - L15	P1
EU 2	K_W06, K_W07, K_W08, K_W09 K_U04, K_U07, K_K02, K_K03,	C2	L1 - L15 P1 - P15	F1, F2
EU 3	K_W05, K_W06, K_W07, K_W08, K_W09 K_U04, K_U07, K_K02, K_K03,	C3	L1 - L15 P10 - P13	P1

FORM OF ASSESSMENT - DETAILS

EU1 The student is able to define and know the classification of logistics projects, additionally can indicate their importance for the organization and the basic elements of their management.

- › 2, 0 The student is not able to define and does not know the classification of logistical projects, in addition he/she is not able to indicate their importance for the organisation and the basic elements of their management.
- › 3,0 The student is able to partially define and know the classification of logistics projects, additionally he can indicate their importance for the organization and the basic elements of their management.
- › 3,5 The student can almost define and know the classification of logistics projects, additionally can indicate their importance for the organization and the basic elements of their management.

- › 4.0 The student is able to define well and knows the classification of logistic projects, additionally can indicate their importance for the organization and the basic elements of their management.
- › 4.5 The student is able to define almost very well and knows the classification of logistics projects, additionally he can indicate their importance for the organization and the basic elements of their management.
- › 5.0 The student is able to define very well and knows the classification of logistics projects, additionally, he can indicate their importance for the organization and the basic elements of their management.

EU2 The student is able to characterize the project management process in organizations.

- › 2.0 The student is not able to characterize the project management process in organizations.
- › 3.0 The student is able to characterize the process of project management in organizations.
- › 3.5 The student can almost describe the process of project management in organizations.
- › 4.0 The student is able to characterize the project management process in organizations well.
- › 4.5 The student can almost very well characterize the project management process in organizations.
- › 5.0 Student can describe the project management process in organizations very well.

EU3 The student is able to construct a logistics project plan using the known planning techniques - Microsoft Project.

- › 2.0 The student is not able to construct a logistics project plan using the known planning techniques - Microsoft Project.
- › 3.0 The student is able to partially construct a logistics project plan using the known planning techniques - Microsoft Project.
- › 3.5 The student can almost construct a logistics project plan using the known planning techniques - Microsoft Project.
- › 4.0 The student is able to construct a logistic project plan well using the known planning techniques - Microsoft Project.

- › 4.5 The student is able to construct a logistics project plan almost very well using the known planning techniques - Microsoft Project.
- › 5,0 Student construct a logistic project plan very well using the known planning techniques - Microsoft Project.

Polish course name	KSZTAŁTOWANIE WŁASNOŚCI MATERIAŁÓW
English course name	SHAPING OF MATERIALS PROPERTIES
Course code	WIP-MDL-D1-SOMP-06
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	6
Number of ECTS points	4
Ways of assessment	Exam

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15			15	

TEACHERS:

Dr inż. Paweł Wieczorek.

COURSE OBJECTIVES:

- › **C1** Providing students with knowledge in the field of shaping of materials properties.
- › **C2** Obtaining by the students the practical skills in the field of shaping of materials properties.

**PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER
COMPETENCES:**

1. Basic knowledge of materials science and thermodynamics.
2. Ability to work independently and in a group.
3. Ability to use literature and internet sources.

COURSE CONTENT

LECTURE

L1 Issues concerning the relationship between the structure, properties and the manufacturing process.

L2 Shaping of the structure and properties by plastic deformation. High effective plastic deformation.

L3 Shaping of the structure and properties using powder metallurgy: manufacturing of powders, preparing, cold forming, sintering and finishing techniques.

L4 Techniques of the structure and properties shaping of surface engineering materials PVD, CVD techniques.

L5 Shaping of the structure and properties by casting technologies.

LABORATORY

Lab1, Lab2 Investigations of the structure and properties of materials created by plastic deformation. High effective plastic deformation.

Lab3, Lab4 Investigations of the structure and properties of materials created by powder metallurgy.

Lab5, Lab6 Investigations of the structure and properties of surface of materials created by CVD and PVD techniques.

Lab7, Lab8 Investigations of the structure and properties of materials created by casting technologies.

BASIC REFERENCES

1. M. Ashby, H. Shercliff, D. Cebon, Inżynieria materiałowa, Wydawnictwo Galaktyka, Łódź 2011 r.
2. L.A. Dobrzański, Wprowadzenie do nauki o materiałach, Wydawnictwo Politechniki Śląskiej, Gliwice 2007 r.
3. L.A. Dobrzański, Materiały inżynierskie i projektowanie materiałowe. Podstawy nauki o materiałach i metaloznawstwo, Wydawnictwo Naukowo-Techniczne, Warszawa 2006 r.
4. L.A. Dobrzański, Podstawy kształtowania struktury i własności materiałów metalowych, Wydawnictwo Politechniki Śląskiej, Gliwice 2007 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. Lacki P., Więckowski W., Luty G., Wieczorek P., Motyka M., Evaluation of Usefulness of AlCrN Coatings for Increased Life of Tools Used in Friction Stir Welding (FSW) of Sheet Aluminum Alloy, Materials, vol. 13 iss. 18, 2020 r.

2. Golański G., Merda A., Wieczorek P., Klimaszewska K., Metody badania wybranych właściwości mechanicznych materiałów metalowych i ich złączy spawanych- Politechnika Częstochowska, 2021 r.

LEARNING OUTCOMES

- › **EU1** Student has basic theoretical knowledge in the field of shaping of materials properties.
- › **EU2** Student is able to practical use knowledge in the field of shaping of materials properties.

TEACHING TOOLS

- › Multimedia presentations.
- › Laboratory equipment and guides.

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

- › **F1.** Assessment of preparation for exercises
- › **F2.** Assessment of the ability to apply the acquired knowledge during exercises
- › **P1.** Assessment of the mastery of the teaching material being the subject of exercises - Exam.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures	15	0,6
Seminar		
Classes		
Laboratory	15	0,6
Project		
Test		
Exam	2	0,08
Total contact hours	32	1,28
Student's own work		
Getting acquainted with the indicated literature	15	0,6
Preparation for seminar		

Preparation for classes		
Preparation for lab	30	1,2
Project preparation		
Consultation	6	0,24
Preparation for the exam	17	0,68
Total student's own work	68	2,72
Total number of hours/ ECTS points for the course	100	4,0

ADDITIONAL INFORMATION

Timetable of classes	https://wip.pcz.pl/dla-studentow
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,	C1	L1 - L5	P1
EU 2	K_W04, K_U08, K_K02,	C2	Lab1 - Lab8	F1, F2

FORM OF ASSESSMENT - DETAILS

EU1 Student has basic theoretical knowledge in the field of shaping of materials properties.

- › 2,0 The student has not any basic knowledge in the field of shaping of materials properties.
- › 3,0 The student has a basic knowledge in the field of shaping of materials properties.
- › 3,5 The student has a little more than basic knowledge in the field of shaping of materials properties.

- › 4,0 The student has a basic knowledge in the field of shaping of materials properties and is able to characterize a goal with their use at good level.
- › 4,5 The student has a basic knowledge in the field of shaping of materials properties and is able to characterize a goal with their use at almost perfect level.
- › 5,0 The student has a basic knowledge in the field of shaping of materials properties and is able to characterize a goal with their use at perfect level.

EU2 Student is able to practical use knowledge in the field of shaping of materials properties.

- › 2,0 The student is no able to practice use knowledge of the shaping of materials properties.
- › 3,0 The student has only a basic practical knowledge of the shaping of materials properties.
- › 3,5 The student has an almost good practice knowledge of the shaping of materials properties.
- › 4,0 The student correctly uses the knowledge and solves the problems of the shaping of materials properties.
- › 4,5 The student has almost very well mastered the practical knowledge of the shaping of materials properties.
- › 5,0 The student has mastered the practical knowledge of the shaping of materials properties.

Polish course name	BADANIA OPERACYJNE
English course name	OPERATIONAL RESEARCH
Course code	WIP-MDL-D1-OR-06
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	6
Number of ECTS points	2
Ways of assessment	Test

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15			15	

TEACHERS:

Dr inż. Edyta Kardas,

Dr inż. Dominika Strycharska,

Dr inż. Sławomir Morel.

COURSE OBJECTIVES:

- › **C1** Providing students with knowledge of the construction and use of various decision models.
- › **C2** Acquiring the ability to build and use independently a simple decision model; interpretation of data resulting from mathematical programming.
- › **C3** Acquiring the ability to optimize decision-making problems on the basis of the created mathematical models.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Basic knowledge of mathematics.
2. Basic knowledge of economics.
3. Ability to work independently and in a group.
4. Ability to use engineering calculator.
5. Ability to use literature and internet resources.

COURSE CONTENT

LECTURE

- › **L1** Scope and applications of operations research. Mathematical model of the decision problem. Examples of issues. Supporting decision-making processes using mathematical programming methods.
- › **L2** Basic programs in the field of mathematical programming. Linear programming problem.
- › **L3** The graphic method and its various solutions. Dual program.
- › **L4** Issues: allocation (work), production line, cutting and loading.
- › **L5, L6** Simplex method.
- › **L7** Integer programming. The method of division and constraints.
- › **L8, L9** Transport algorithm.
- › **L10** The problem of maximum flow in networks. Action networks.
- › **L11, L12** Planning of projects. CPM method.
- › **L13, L14** Elements of game theory. Two-player zero-sum games. Optimal strategies. Games with nature.
- › **L15** The use of operational research methods in production management.

LABORATORY

- › **Lab1** Acquainting students with the rules of passing the course. The scope and application of operations research.
- › **Lab2** Structure of a mathematical programming problem.
- › **Lab3** Graphical method of solving linear programming problems.
- › **Lab4, Lab5** Application of a dual program to solve linear programming problems using the graphical method.
- › **Lab6, Lab7** Application of the known tools to solve problems related to: division of labor, cutting and unloading.
- › **Lab8, Lab9** Simplex method of solving linear program problems.
- › **Lab10** Integer programming.
- › **Lab11, Lab13** Application of the transport algorithm.
- › **Lab12, Lab 14** Project planning. Application of the CPM method.
- › **Lab15** Use of the knowledge of operations research - test.

BASIC REFERENCES

1. B. Baronowska, K. Bieńkowska – Lipińska, M. Lipiec – Zajchowska, W. Szymanowski: Badania operacyjne w zarządzaniu, Wydawnictwa Prywatnej Szkoły Biznesu i Administracji, Warszawa, 1996 r.
2. B. Guzik: Elementy ekonometrii i badań operacyjnych dla studiów licencjackich, Wydawnictwo Akademii Ekonomicznej w Poznaniu, Poznań, 2006 r.
3. B. Guzik, W. Sikora: Badania operacyjne i ekonometria. Cz. I. Programowanie liniowe, Wydawnictwo Akademii Ekonomicznej w Poznaniu, Poznań, 1993 r.
4. Z. Jędrzejczyk, J. Skrzypek, K. Kukuła, A. Walkosz: Badania operacyjne w przykładach i zadaniach, Wydawnictwo Naukowe PWN, Warszawa, 2021 r.
5. E. Krzywiecka: Elementy badań operacyjnych w przykładach i zadaniach, Wydawnictwo Wyższej Szkoły Ekonomii i Administracji w Bytomiu, Bytom, 2002 r.
6. A. Nowak: Optymalizacja. Teoria i zadania, Wydawnictwo Politechniki Śląskiej, Gliwice, 2021 r.
7. S. Kowalik: Nowoczesne metody optymalizacyjne w zastosowaniach górniczych i ekonomicznych, Wydawnictwo Politechniki Śląskiej, Gliwice, 2004 r.
8. M. Siudak: Badania operacyjne, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa, 2012 r.
9. D. Witkowska: Wprowadzenie do badań operacyjnych, Wydawnictwo Politechniki Łódzkiej, Łódź 1996 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. G.H. Mitchell: Badania operacyjne. Metody i przykłady, Wydawnictwa Naukowo – Techniczne, Warszawa, 1977 r.
2. A. Kadziński: Badania operacyjne. Ćwiczenia laboratoryjne, Wydawnictwo Politechniki Poznańskiej, Poznań, 1994 r.
3. W. Radzikowski: Badania operacyjne w zarządzaniu, Wydawnictwa Uniwersytetu Warszawskiego, Warszawa, 1994 r.
4. H.M. Wagner: Badania operacyjne. Zastosowania w zarządzaniu, Polskie Wydawnictwo Ekonomiczne, Warszawa, 1980 r.

LEARNING OUTCOMES

- › **EU1** The student has knowledge related to the problems of various methods helpful in the decision-making process.
- › **EU2** The student has knowledge related to the application of methods and tools useful in linear programming.
- › **EU3** The student is able to build and solve a simple decision model using the methods and tools of network programming and elements of game theory.

TEACHING TOOLS

- › Multimedia presentations.
- › Laboratory equipment and guides.
- › Computer stations with software.

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

- › **F1.** Assessment of the ability to apply the acquired knowledge during laboratory exercises.
- › **F2.** Assessment of activity during classes.
- › **P1.** Assessment of the mastery of the teaching material being the subject of laboratory exercises - final test.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures	15	0,6
Seminar		
Classes		
Laboratory	15	0,6
Project		
Test		
Exam		
Total contact hours	30	1,2
Student's own work		
Getting acquainted with the indicated literature	6	0,24

Preparation for seminar		
Preparation for classes		
Preparation for lab	6	0,24
Project preparation		
Consultation	4	0,16
Preparation for the test	4	0,16
Total student's own work	20	0,8
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_W03, K_U04, K_U05, K_K02,	C1, C2, C3	L1 - L15, Lab1 - Lab15	F1, F2, P1
EU 2	K_W01, K_W03, K_U04, K_U05, K_K02,	C1, C2, C3	L1 - L9, Lab1 - Lab12, Lab15	F1, F2, P1
EU 3	K_W01,	C1, C2, C3	L10 - L15	F1, F2, P1

	K_W03, K_U04, K_U05, K_K02,		Lab13 - Lab15	
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FORM OF ASSESSMENT - DETAILS

EU1 The student has knowledge related to the problems of various methods helpful in the decision-making process.

- › 2,0 The student has not knowledge related to the problems of various methods helpful in the decision-making process.
- › 3,0 The student has knowledge related to the problems of various methods helpful in the decision-making process at minimum level.
- › 3,5 The student has knowledge related to the problems of various methods helpful in the decision-making process at almost good level.
- › 4,0 The student has knowledge related to the problems of various methods helpful in the decision-making process at good level.
- › 4,5 The student has knowledge related to the problems of various methods helpful in the decision-making process at almost perfect level.
- › 5,0 The student has knowledge related to the problems of various methods helpful in the decision-making process at perfect level.

EU2 The student has not knowledge related to the application of methods and tools useful in linear programming.

- › 2,0 The student has knowledge related to the application of methods and tools useful in linear programming.
- › 3,0 The student has knowledge related to the application of methods and tools useful in linear programming at minimum level.
- › 3,5 The student has knowledge related to the application of methods and tools useful in linear programming at almost good level.
- › 4,0 The student has knowledge related to the application of methods and tools useful in linear programming at good level.
- › 4,5 The student has knowledge related to the application of methods and tools useful in linear programming at almost perfect level.
- › 5,0 The student has knowledge related to the application of methods and tools useful in linear programming at perfect level.

EU 3 The student is able to build and solve a simple decision model using the methods and tools of network programming and elements of game theory.

- › 2,0 The student is not able to build and solve a simple decision model using the methods and tools of network programming and elements of game theory.
- › 3,0 The student is able to build and solve a simple decision model using the methods and tools of network programming and elements of game theory at minimum level.
- › 3,5 The student is able to build and solve a simple decision model using the methods and tools of network programming and elements of game theory at almost good level.
- › 4,0 The student is able to build and solve a simple decision model using the methods and tools of network programming and elements of game theory at good level.
- › 4,5 The student is able to build and solve a simple decision model using the methods and tools of network programming and elements of game theory at almost perfect level.
- › 5,0 The student is able to build and solve a simple decision model using the methods and tools of network programming and elements of game theory at perfect level.

Polish course name	METODY ILOŚCIOWE W ZARZĄDZANIU
English course name	QUANTITATIVE METHODS IN MANAGEMENT
Course code	WIP-MDL-D1-QMIM-06
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	6
Number of ECTS points	2
Ways of assessment	Test

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15			15	

TEACHERS:

Dr inż. Edyta Kardas,

Dr inż. Rafał Wyczółkowski,

Dr inż. Sławomir Morel.

COURSE OBJECTIVES:

- › **C1** Provide students with knowledge of quantitative methods supporting management.
- › **C2** Learning about quantitative methods and tools supporting management and enabling decision making by students.
- › **C3** Ability to use the known methods for situational analysis and the decision-making process in management.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Basic knowledge of mathematics, statistics and economics.
2. The ability to think logically and to analyze management-related phenomena.
3. Ability to work independently and in a group.
4. Ability to work on a computer with a typical Windows operating system.
5. Ability to use literature and internet resources.

COURSE CONTENT

LECTURE

- › **L1** The scope of the subject of quantitative methods in management. Basic quantitative methods. Linking the subject matter with the subject of statistics.
- › **L2, L3** Assessment of cause and effect relationships between phenomena.
- › **L4** Study of the dynamics of phenomena. Individual and aggregate indices.
- › **L5** Building time trends and analysis of seasonal fluctuations.
- › **L6** Econometric modelling. Stages of econometric modelling. Types of econometric models.
- › **L7** Linear econometric models. Selection of variables for linear econometric models.
- › **L8, L9** Construction and evaluation of linear econometric models.
- › **L10** Forecasting on the basis of linear econometric models.
- › **L11** Nonlinear modelling. Production function.
- › **L12, L13** Elements of linear programming and the simplex method as an example of analytical management models in a company. Use of computer tools.
- › **L14, L15** The use of quantitative methods in production management.

LABORATORY

- › **Lab1** Topics of the subject. The use of computer methods in quantitative methods in management.
- › **Lab2** Graphical presentation of the results used in quantitative methods in management.
- › **Lab3** Assessment of the dependence of phenomena using correlation coefficients: quantitative and qualitative variables.
- › **Lab4** Linear regression function - construction and evaluation of models.
- › **Lab5** Assessment of the dynamics of phenomena - individual increments and indexes, aggregate indexes.
- › **Lab6** Assessment of the dynamics of phenomena: construction of a linear trend and a model of seasonal fluctuations in time.
- › **Lab7** Construction of a linear econometric model - methods of selecting variables for the model.

- › **Lab8** Construction of a linear econometric model - estimation of model parameters using the least squares method.
- › **Lab9** Construction of a linear econometric model - checking the model assumptions.
- › **Lab10** Construction of an econometric model - using models in enterprise management.
- › **Lab11** Elements of construction of econometric nonlinear models.
- › **Lab12** Production function and its interpretation.
- › **Lab13** The use of computer tools to solve linear programming problems.
- › **Lab 14** The use of statistical analyses to evaluate the company's operations.
- › **Lab15** The use of a selected model - test.

BASIC REFERENCES

1. A. Goryl, Z. Jędrzejczyk, K. Kukuła (red. nauk.), J. Osiewalski, A. Walkosz: Wprowadzenie do ekonometrii w przykładach i zadaniach, Wydawnictwo Naukowe PWN, Warszawa 2009 r.
2. B. Guzik: Elementy ekonometrii i badań operacyjnych dla studiów licencjackich, Wydawnictwo Akademii Ekonomicznej w Poznaniu, Poznań 2006 r.
3. E. Nowak (red.): Metody statystyczne w analizie działalności przedsiębiorstwa, Polskie Wydawnictwo Ekonomiczne, Warszawa 2001 r.
4. E. Nowak: Zarys metod ekonometrii. Zbiór zadań, Wydawnictwo Naukowe PWN, Warszawa 2007 r.
5. S. Ostasiewicz, Z. Rusnak, U. Siedlecka: Statystyka. Elementy teorii i zadania, Wydawnictwo Akademii Ekonomicznej im. Oskara Langego we Wrocławiu, Wrocław 1997 r.
6. A. Snarska: Statystyka. Ekonometria. Prognozowanie. Ćwiczenia z Excelem, Wydawnictwo Placet, Warszawa 2014 r.
7. M. Sobczyk: Statystyka, Wydawnictwo Naukowe PWN, Warszawa 2021 r.
8. W. Starzyńska: Statystyka praktyczna, Wydawnictwo naukowe PWN, Warszawa 2006 r.
9. K. Twardowska, P. Łodyga: Modele zarządzania wspomagane Excelem, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2003 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. M. Balcerowicz – Szkutnik, W. Szkutnik: Podstawy statystyki w przykładach i zadaniach. Cz. I.: Statystyka opisowa, Wydawnictwo Śląskiej Wyższej Szkoły Zarządzania im. Gen. Jerzego Ziętka w Katowicach, Katowice 2009 r.
2. M. Balcerowicz – Szkutnik, W. Szkutnik: Podstawy statystyki w przykładach i zadaniach. Cz. II.: Elementy rachunku prawdopodobieństwa i wnioskowania statystycznego, Wydawnictwo Śląskiej Wyższej Szkoły Zarządzania im. Gen. Jerzego Ziętka w Katowicach, Katowice 2009 r.
3. B. V. Liengme: Excel w zarządzaniu i biznesie, Wydawnictwo RM, Warszawa 2002 r.
4. E. Sojka: Statystyka w przykładach i zadaniach, Wydawnictwo Wyższej Szkoły Zarządzania i Nauk Społecznych w Tychach, Tychy 2003 r.
5. M. Siudak: Badania operacyjne, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2012 r.
6. T. Szapiro: Decyzje menedżerskie z Excelem, PWE, Warszawa 2000 r.

LEARNING OUTCOMES

- › **EU1** The student has a basic knowledge of the possibilities of using quantitative methods in business management.
- › **EU2** The student is able to assess the strength of the relationship between various phenomena with the use of appropriate measures.
- › **EU3** The student is able to analyse the changes of the phenomenon over time with the use of dynamics measures, trend functions and seasonal fluctuations.
- › **EU4** The student is able to build, evaluate and use simple econometric models to describe economic phenomena.

TEACHING TOOLS

- › Multimedia presentations.
- › Laboratory equipment and guides.
- › Computer stations with software.

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

- › **F1.** Assessment of the ability to apply the acquired knowledge during laboratory exercises

- › **F2.** Assessment of activity during classes
- › **P1.** Assessment of the mastery of the teaching material being the subject of laboratory exercises - final test

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures	15	0,6
Seminar		
Classes		
Laboratory	15	0,6
Project		
Test		
Exam		
Total contact hours	30	1,2
Student's own work		
Getting acquainted with the indicated literature	6	0,24
Preparation for seminar		
Preparation for classes		
Preparation for lab	6	0,24
Project preparation		
Consultation	4	0,16
Preparation for the test	4	0,16
Total student's own work	20	0,8
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_W03, K_U04, K_U05, K_K02,	C1, C2, C3	L1 - L15, Lab1 - Lab15	F1, F2, P1
EU 2	K_W01, K_W03, K_U04, K_U05, K_K02,	C1, C2, C3	L2 - L3, Lab3 - Lab4, Lab15	F1, F2, P1
EU 3	K_W01, K_W03, K_U04, K_U05, K_K02,	C1, C2, C3	L4 - L5, Lab5 - Lab6, Lab15	F1, F2, P1
EU4	K_W01, K_W03, K_U04, K_U05, K_K02,	C1, C2, C3	L6 - L11 Lab7 - Lab15	F1, F2, P1

FORM OF ASSESSMENT - DETAILS

EU1 The student has a basic knowledge of the possibilities of using quantitative methods in business management.

- › 2,0 The student has not any basic knowledge of the possibilities of using quantitative methods in business management.
- › 3,0 The student has a basic knowledge of the possibilities of using quantitative methods in business management at minimum level.

- › 3,5 The student has a basic knowledge of the possibilities of using quantitative methods in business management at almost good level.
- › 4,0 The student has a basic knowledge of the possibilities of using quantitative methods in business management at good level.
- › 4,5 The student has a basic knowledge of the possibilities of using quantitative methods in business management at almost perfect level.
- › 5,0 The student has a basic knowledge of the possibilities of using quantitative methods in business management at perfect level.

EU2 The student is able to assess the strength of the relationship between various phenomena with the use of appropriate measures.

- › 2,0 The student is not able to assess the strength of the relationship between various phenomena with the use of appropriate measures.
- › 3,0 The student is able to assess the strength of the relationship between various phenomena with the use of appropriate measures at minimum level.
- › 3,5 The student is able to assess the strength of the relationship between various phenomena with the use of appropriate measures at almost good level.
- › 4,0 The student is able to assess the strength of the relationship between various phenomena with the use of appropriate measures at good level.
- › 4,5 The student is able to assess the strength of the relationship between various phenomena with the use of appropriate measures at almost perfect level.
- › 5,0 The student is able to assess the strength of the relationship between various phenomena with the use of appropriate measures at perfect level.

EU 3 The student is able to analyse the changes of the phenomenon over time with the use of dynamics measures, trend functions and seasonal fluctuations.

- › 2,0 The student is able not to analyse the changes of the phenomenon over time with the use of dynamics measures, trend functions and seasonal fluctuations.
- › 3,0 The student is able to analyse the changes of the phenomenon over time with the use of dynamics measures, trend functions and seasonal fluctuations at minimum level.
- › 3,5 The student is able to analyse the changes of the phenomenon over time with the use of dynamics measures, trend functions and seasonal fluctuations at almost good level.

- › 4,0 The student is able to analyse the changes of the phenomenon over time with the use of dynamics measures, trend functions and seasonal fluctuations at good level.
- › 4,0 The student is able to analyse the changes of the phenomenon over time with the use of dynamics measures, trend functions and seasonal fluctuations at almost perfect level.
- › 5,0 The student is able to analyse the changes of the phenomenon over time with the use of dynamics measures, trend functions and seasonal fluctuations at perfect level.

EU 4 The student is able to build, evaluate and use simple econometric models to describe economic phenomena.

- › 2,0 The student is not able to build, evaluate and use simple econometric models to describe economic phenomena.
- › 3,0 The student is able to build, evaluate and use simple econometric models to describe economic phenomena at minimum level.
- › 3,5 The student is able to build, evaluate and use simple econometric models to describe economic phenomena at almost good level.
- › 4,0 The student is able to build, evaluate and use simple econometric models to describe economic phenomena at good level.
- › 4,5 The student is able to build, evaluate and use simple econometric models to describe economic phenomena at almost perfect level.
- › 5,0 The student is able to build, evaluate and use simple econometric models to describe economic phenomena at perfect level.

Polish course name	ZARZĄDZANIE WIEDZĄ
English course name	KNOWLEDGE MANAGEMENT
Course code	WIP-MDL-D1-KM-06
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	6
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. Rafał Prusak, prof. PCz.,

Dr inż. Marzena Ogórek,

Dr inż. Dominika Strycharska.

COURSE OBJECTIVES:

- › **C1** Providing students with advanced aspects of knowledge concerning the methods of knowledge management in the enterprise.
- › **C2** Acquainting students with modern methods of human capital development in enterprises.
- › **C3.** Acquisition of skills by students as part of shaping selected elements of knowledge management systems in enterprises.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Knowledge in the field of marketing in the area of competition in the modern economy and affiliate marketing.
2. Knowledge in the field of management in terms of the characteristics and goals of the organization and its components, planning, steering and

controlling processes in enterprises and contemporary management concepts.

3. Management knowledge in the area of personnel selection and human resource management, Features and goals of the organization and its components.
4. Ability to work independently and in a group.
5. Ability to use literature sources and internet resources.

COURSE CONTENT

LECTURE

- › **L1** Types of knowledge in organizations. Objectives, benefits and barriers of knowledge management.
- › **L2, L3** Characteristics of the basic models of knowledge management in enterprises.
- › **L4, L5** Characteristics of knowledge management elements.
- › **L6, L7** Types of knowledge. Strategies for managing personalized and codified knowledge.
- › **L8, L9** Basic methods of knowledge measurement.
- › **L10** Methods of knowledge management.
- › **L11, L12** The impact of knowledge management on the value of intellectual capital in enterprises.
- › **L13, L14** Directional audit of knowledge management in enterprises.
- › **L15** Basic aspects of the knowledge-based economy.

CLASSES

- › **C1** Typology of knowledge in selected types of organization.
- › **C2** Methods of knowledge codification.
- › **C3, C4** Identification of tacit and intuitive knowledge in organizations.
- › **C5, C6** Shaping employee competency portfolios. Identifying the knowledge gap.
- › **C7, C8** Computerization of management and communication processes in enterprises.
- › **C9** The importance of managerial staff in knowledge management processes. The role of the leader.

- › **C10, C11** Shaping work organization based on team work and exchange of experiences.
- › **C12, C13** Analysis of the ethical and organizational aspect of knowledge sharing within the organization.
- › **C14, C15** External sources of knowledge. Search for knowledge.

BASIC REFERENCES

1. Ashok Jaspara, Zarządzanie wiedzą, zintegrowane podejście, PWE, Warszawa 2006 r.
2. Bolesta – Kukułka, K. Decyzje menedżerskie w teorii i praktyce zarządzania, Wyd. Naukowe WZ UW, Warszawa 2000 r.
3. Drucker, P.F., Zarządzanie w czasach burzliwych. Nowe wyzwania – nowe horyzonty, Akademia Ekonomiczna w Krakowie, „Nowoczesność” Sp.z o. o., Warszawa 1995 r.
4. Fazlagić A.J., Zarządzanie wiedzą, Milenium, Gniezno 2006 r.
5. Kordel P., Kornecki J., Kowalczyk A., Krawczyk K., Pylak K., Wiktorowicz J., Inteligentne organizacje – zarządzanie wiedzą i kompetencjami pracowników, PARP, Warszawa 2010 r.
6. Mikuła B., Zarządzanie wiedzą w organizacji, [w:] B. Mikuła, A. Pietruszka-Ortyl, A. Potocki (red.), Podstawy zarządzania przedsiębiorstwami w gospodarce opartej na wiedzy, Difin, Warszawa 2007 r.
7. Nonaka, I., Takeuchi H., Kreowanie wiedzy w organizacji, Poltext, Warszawa, 2000 r.
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9. Rosenberg, M.J., E-Learning, Mc Graw-Hill, N-Y, Chicago, 2001 r.
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SUPPLEMENTARY REFERENCE MATERIALS

1. Griffin R.W., Podstawy zarządzania organizacjami, Wydawnictwo Naukowe PWN, Warszawa 2006 r.

2. Drucker P. F., Zarządzanie w XXI wieku, Muza SA, Warszawa 2000 r.
3. Prusak R., Kształtowanie struktury kapitału intelektualnego przedsiębiorstwa, Politechnika Częstochowska, Prace Naukowe Wydziału Inżynierii Procesowej, Materiałowej i Fizyki Stosowanej, Seria: Monografie Nr 34, Częstochowa 2013 r.

LEARNING OUTCOMES

- › **EU1** The student has knowledge of the importance of knowledge in contemporary organizations. Is aware of the need to manage knowledge as an important factor in shaping competitive advantages.
- › **EU2** The student has theoretical knowledge concerning the influence of knowledge on the methods of company management and shaping the company's strategy.

TEACHING TOOLS

- › Multimedia presentations.
- › Laboratory equipment and guides.
- › CUT e-learning platform (possible use).

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

- › **F1.** Assessment of knowledge in the field of basic concepts in the field of organization and business management.
- › **F2.** Assessment of self-preparation of exercises.
- › **P1.** 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	2	0,08
Exam		
Total contact hours	32	1,28
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	10	0,4
Total student's own work	43	1,72
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_W07, K_U07, K_K02,	C1, C2, C3	L1 - L15 C1 - C15	F1, F2, P1
EU 2	K_W07, K_U07, K_K02,	C1, C2, C3	L1 - L15 C1 - C15	F1, F2, P1

FORM OF ASSESSMENT - DETAILS

EU1 The student has a working knowledge of the importance of knowledge in contemporary organizations. Is aware of the need to manage knowledge as an important factor in shaping competitive advantages.

- › 2,0 The student has no practical knowledge of the importance of knowledge in contemporary organizations.
- › 3,0 The student has a sufficiently practical knowledge about the importance of knowledge in contemporary organizations.
- › 3,5 The student has practical knowledge about the importance of knowledge in contemporary organizations to a satisfactory plus degree.
- › 4,0 The student has a good working knowledge of the importance of knowledge in contemporary organizations. Is aware of the need to manage knowledge as an important factor in shaping competitive advantages.
- › 4,5 The student has practical knowledge about the importance of knowledge in contemporary organizations to a good plus degree. Is aware of the need to manage knowledge as an important factor in shaping competitive advantages.
- › 5,0 The student has a very good practical knowledge of the importance of knowledge in contemporary organizations. Is aware of the need to manage knowledge as an important factor in shaping competitive advantages and knows the basic mechanisms of this process.

EU2 The student has theoretical knowledge about the impact of knowledge on the methods of business management and shaping the company's strategy.

- › 2,0 The student does not have theoretical knowledge concerning the influence of knowledge on the methods of company management.
- › 3,0 The student has a sufficient theoretical knowledge concerning the influence of knowledge on the methods of enterprise management.
- › 3,5 The student has theoretical knowledge about the impact of knowledge on the methods of business management to a satisfactory plus degree.
- › 4,0 The student has a good theoretical knowledge concerning the influence of knowledge on the methods of company management and shaping the company's strategy.

- › 4,5 The student has theoretical knowledge concerning the influence of knowledge on the methods of company management and shaping the company's strategy to a good plus degree.
- › 5,0 The student has a very good theoretical knowledge concerning the influence of knowledge on the methods of company management and can participate in the work on shaping the company's strategy.

Polish course name	ZARZĄDZANIE KAPITAŁEM INTELEKTUALNYM
English course name	INTELLECTUAL CAPITAL MANAGEMENT
Course code	WIP-MDL-D1-ICM-06
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	6
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. Rafał Prusak, prof. PCz.,

Dr inż. Marzena Ogórek,

Dr inż. Dominika Strycharska.

COURSE OBJECTIVES:

- › **C1** Providing students with advanced aspects of knowledge concerning the methods of intellectual capital management in the enterprise.
- › **C2** Acquainting students with modern methods of human capital development in enterprises.
- › **C3** Acquisition of skills by students as part of shaping selected elements of intellectual capital management systems in enterprises.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Knowledge in the field of marketing in the area of competition in the modern economy and affiliate marketing.
2. Knowledge in the field of management in terms of the characteristics and goals of the organization and its components, planning, steering and

controlling processes in enterprises and contemporary management concepts.

3. Management knowledge in the area of personnel selection and human resource management, Features and goals of the organization and its components.
4. Ability to work independently and in a group.
5. Ability to use literature sources and internet resources.

COURSE CONTENT

LECTURE

- › **L1** Contemporary approach to intellectual capital.
- › **L2, L3** The influence of intellectual capital on the efficiency of the enterprise.
- › **L4, L5, L6** Human capital.
- › **L7, L8** Structural capital.
- › **L9, L10** Relational capital.
- › **L11 - L13** Valuation of the value of intellectual capital.
- › **L14, L15** Knowledge management in the process of shaping intellectual capital.

CLASSES

- › **C1 - C4** Analysis of human capital.
- › **C5, C6** Identification and evaluation of the components of the company's structural capital.
- › **C7, C8** Shaping relations with suppliers and recipients in the context of intellectual capital management.
- › **C9 - C15** Methods of intellectual capital valuation.

BASIC REFERENCES

1. Ashok Jaspara: Zarządzanie wiedzą, zintegrowane podejście, PWE, Warszawa 2006 r.
2. Bolesta – Kukułka, K.: Decyzje menedżerskie w teorii i praktyce zarządzania, Wyd. Naukowe WZ UW, Warszawa 2000 r.
3. Drucker, P.F.: Zarządzanie w czasach burzliwych. Nowe wyzwania – nowe horyzonty, Akademia Ekonomiczna w Krakowie, „Nowoczesność” Sp.z o. o., Warszawa 1995 r.
4. Fazlagić A.J.: Zarządzanie wiedzą, Milenium, Gniezno 2006 r.

5. Kordel P., Kornecki J., Kowalczyk A., Krawczyk K., Pylak K., Wiktorowicz J.: Inteligentne organizacje - zarządzanie wiedzą i kompetencjami pracowników, PARP, Warszawa 2010 r.
6. Mikuła B.: Zarządzanie wiedzą w organizacji, [w:] B. Mikuła, A. Pietruszka-Ortyl, A. Potocki (red.), Podstawy zarządzania przedsiębiorstwami w gospodarce opartej na wiedzy, Difin, Warszawa 2007 r.
7. Nonaka I.: Takeuchi H. Kreowanie wiedzy w organizacji, Poltext, Warszawa, 2000 r.
8. Oleński J.: Standardy informacyjne w gospodarce, Wyd. Uniwersytetu Warszawskiego. Warszawa 1997 r.
9. Rosenberg M.J.: E-Learning, Mc Graw-Hill, N-Y, Chicago, 2001 r.
10. Wawrzyniak B.: Od koncepcji do praktyki zarządzania wiedzą w przedsiębiorstwie - w pracy zbiorowej: Zarządzanie wiedzą w przedsiębiorstwie, Polska Fundacja Promocji Kadr i WSPiZ, Warszawa, 2001 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. Griffin R.W.: Podstawy zarządzania organizacjami, Wydawnictwo Naukowe PWN, Warszawa 2006 r.
2. Drucker P. F.: Zarządzanie w XXI wieku, Muza SA, Warszawa 2000 r.
3. Prusak R.: Kształtowanie struktury kapitału intelektualnego przedsiębiorstwa, Politechnika Częstochowska, Prace Naukowe Wydziału Inżynierii Procesowej, Materiałowej i Fizyki Stosowanej, Seria: Monografie Nr 34, Częstochowa 2013 r.

LEARNING OUTCOMES

- › **EU1** The student has knowledge of the importance of intellectual capital in contemporary organizations. Is aware of the need to manage intellectual capital as an important factor in shaping competitive advantages.
- › **EU2** The student has theoretical knowledge concerning the influence of intellectual capital on the methods of company management and shaping the company's strategy.

TEACHING TOOLS

- › Multimedia presentations.
- › Laboratory equipment and guides.
- › CUT e-learning platform (possible use).

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

- › **F1.** Assessment of knowledge in the field of basic concepts in the field of organization and business management.
- › **F2.** Assessment of self-preparation of exercises.
- › **P1.** 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	2	0,08
Exam		
Total contact hours	32	1,28
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	10	0,4
Total student's own work	43	1,72
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_W07, K_U07, K_K02,	C1, C2, C3	L1 - L15, C1 - C15	F1, F2, P1
EU 2	K_W07, K_K02, K_U07,	C1, C2, C3	L1 - L15, C1 - C15	F1, F2, P1

FORM OF ASSESSMENT - DETAILS

EU1 The student has a working knowledge of the importance of intellectual capital in contemporary organizations. Is aware of the need to manage intellectual capital as an important factor in shaping competitive advantages.

- › 2,0 The student has no practical knowledge of the importance of intellectual capital in contemporary organizations.
- › 3,0 The student has a sufficiently practical knowledge about the importance of intellectual capital in contemporary organizations.
- › 3,5 The student has practical knowledge about the importance of intellectual capital in contemporary organizations to a satisfactory plus degree.
- › 4,0 The student has a good working knowledge of the importance of intellectual capital in contemporary organizations. Is aware of the need to manage intellectual capital as an important factor in shaping competitive advantages.

- › 4,5 The student has practical knowledge about the importance of intellectual capital in contemporary organizations to a good plus degree. Is aware of the need to manage intellectual capital as an important factor in shaping competitive advantages.
- › 5,0 The student has a very good practical knowledge of the importance of intellectual capital in contemporary organizations. Is aware of the need to manage intellectual capital as an important factor in shaping competitive advantages and knows the basic mechanisms of this process.

EU2 The student has theoretical knowledge about the impact of intellectual capital on the methods of business management and shaping the company's strategy.

- › 2,0 The student does not have theoretical knowledge concerning the influence of intellectual capital on the methods of company management.
- › 3,0 The student has a sufficient theoretical knowledge concerning the influence of intellectual capital on the methods of enterprise management.
- › 3,5 The student has theoretical knowledge about the impact of intellectual capital on the methods of business management to a satisfactory plus degree.
- › 4,0 The student has a good theoretical knowledge concerning the influence of intellectual capital on the methods of company management and shaping the company's strategy.
- › 4,5 The student has theoretical knowledge concerning the influence of intellectual capital on the methods of company management and shaping the company's strategy to a good plus degree.
- › 5,0 The student has a very good theoretical knowledge concerning the influence of intellectual capital on the methods of company management and can participate in the work on shaping the company's strategy.

Polish course name	PRZYGOTOWANIE DO PRACY DYPLOMOWEJ I EGZAMINU DYPLOMOWEGO
English course name	PREPARATION OF THE DIPLOMA THESIS AND PREPARATION FOR THE DIPLOMA EXAM
Course code	WIP-MDL-D1-PFTT-07
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	7
Number of ECTS points	10
Ways of assessment	credit in the form of a presentation

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project

TEACHERS:

Promotor

COURSE OBJECTIVES:

- › **C1** Editing of the thesis in accordance with the applicable rules and requirements.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Basic knowledge of the entire field of study according to the curriculum
2. Ability to work independently
3. Ability to use literature sources and internet resources.

COURSE CONTENT

- › Preparation of the thesis.

- › Preparation of the thesis presentation.

BASIC REFERENCES

1. Rozpondek M., Wyciślik A.: Seminarium dyplomowe. Praca dyplomowa magisterska i inżynierska. Wydawnictwo Politechniki Śląskiej, Gliwice, 2007 r.
2. Boć J., Jak pisać pracę magisterską, Kolonia, Wrocław 2001r.

SUPPLEMENTARY REFERENCE MATERIALS

1. Cabarelli G., Łucki Z., Jak przygotować pracę dyplomową lub doktorską, Kraków 1998r.

LEARNING OUTCOMES

EU1 Drafting of a thesis by the student that meets the editorial, editing and content requirements.

TEACHING TOOLS

- › Audio-visual means.
- › The ability to analyse research results.

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

P1. Assessment of independent thesis preparation.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures		
Seminar		
Classes		
Laboratory		
Project		
Test		
Exam		
Total contact hours		

Student's own work		
Getting acquainted with the indicated literature		
Preparation for seminar		
Preparation for classes		
Preparation for lab		
Project preparation		
Consultation	10	0,4
Preparation for the exam	100	4
Total student's own work	140	5,6
Total number of hours/ ECTS points for the course	250	10

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_U04, K_U09, K_K01, K_K02,	C1		P1

FORM OF ASSESSMENT - DETAILS

EU1 Drafting of a thesis by the student that meets the editorial, editing and content requirements.

2,0 The student has not developed a thesis that meets the requirements of the editorial, editing and content requirements.

- › 3,0 The student has developed a thesis that satisfies the editorial, editing and content requirements to a satisfactory degree.
- › 3,5 The student has developed a thesis that meets the editorial, editing and content requirements fairly well
- › 4,0 The student has developed a thesis that meets the editorial, editing and content requirements to a good degree.
- › 4,5 The student has prepared a diploma project fulfilling in a more than good degree editorial, editing and content requirements
- › 5,0 The student has developed a dissertation that meets the editorial, editing and content requirements to a very good degree.

Polish course name	SEMINARIUM DYPLOMOWE
English course name	DIPLOMA SEMINAR
Course code	WIP-MDL-D1-DS-07
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	7
Number of ECTS points	1
Ways of assessment	credit in the form of a presentation

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
	30			

TEACHERS:

Dr hab. inż. Agata Dudek, prof. PCz.

COURSE OBJECTIVES:

- › **C1** Acquainting students with the methods of scientific work, oral and written presentation of research results.
- › **C2** Preparation of graduates to write and defend their thesis.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Abilities to work independently and in a group.
2. Ability to use literature sources and internet resources.
3. Ability to correctly interpret and present their own research.

COURSE CONTENT

SEMINAR

- › **S1** Objectives for the diploma thesis and the authors of the thesis.
- › **S2** General structure and content (content) of selected parts of the diploma thesis.

- › **S3** References to literature. Correct use of the thematic literature.
- › **S4** Principles of delivering papers (defining the nature of the audience, structure of the presentation, contact with the audience, emphasizing important statements, articulation, discussion).
- › **S5 - S15** The latest trends in materials engineering - student presentations of the state of knowledge and research results.

BASIC REFERENCES

3. Rozpondek M., Wyciślik A.: Seminarium dyplomowe. Praca dyplomowa magisterska i inżynierska.
4. Pierwsza praca, know how, Wydawnictwo Politechniki Śląskiej, Gliwice, 2007 r.
5. M. Korzyński: Metodyka eksperymentu, WNT, W-wa, 2006 r.
6. Braszczyński J.: Projektowanie, wykonanie i opis eksperymentu, Wyd. Pol. Częstochowskiej, 1989 r.
7. <https://wip.pcz.pl/dla-studentow/praca-dyplomowa>.

SUPPLEMENTARY REFERENCE MATERIALS

2. J. Arendarski: Niepewność pomiarów, Wyd. Pol. Warsz. 2003 r.

LEARNING OUTCOMES

- › **EU1** The student has knowledge of the structure and organization of scientific work.
- › **EU2** Preparation of graduate students to write and defend their thesis.

TEACHING TOOLS

- › Seminar with the use of audiovisual resources.
- › Multimedia presentations prepared by the teacher and graduate students.

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

F1. Assessment of the preparation and presentation of multimedia presentations on given topics.

F2. Assessment of activity during classes.

P1. Assessment of the independent presentation and mastery of the teaching material being the subject of the seminar.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures		
Seminar	30	1
Classes		
Laboratory		
Project		
Test		
Exam		
Total contact hours	30	1
Student's own work		
Getting acquainted with the indicated literature		
Preparation for seminar		
Preparation for classes		
Preparation for lab		
Project preparation		
Consultation		
Preparation for the exam		
Total student's own work		
Total number of hours/ ECTS points for the course	30	1

ADDITIONAL INFORMATION

Timetable of classes	https://wip.pcz.pl/dla-studentow/plan-zajec/studia-stacjonarne
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Information about the consultation (time + place)	https://wip.pcz.pl/dla-studentow/konsultacje-dla-studentow
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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_W03, K_W04, K_W05, K_W06, K_W07, K_W08, K_W09, K_U03, K_U04, K_U05, K_U08, K_U09, K_K01, K_K02,	C1	S1 - S15	P1, F1, F2
EU 2	K_W01, K_W02, K_W03, K_W04, K_W05, K_W06, K_W07, K_W08, K_W09, K_U03, K_U04, K_U05, K_U08, K_U09, K_K01, K_K02,	C2	S1 - S15	P1, F1, F2

FORM OF ASSESSMENT - DETAILS

- EU1** The student has knowledge of the structure and organization of scientific work.
- › 2,0 The student has no knowledge of the structure and organization of scientific work
 - › 3,0 The student has some knowledge of the structure and organization of scientific work.
 - › 3,5 The student has almost knowledge of the structure and organization of scientific work.

› 4,0 The student knows well the knowledge of the structure and organization of scientific work.

› 4,5 The student has almost very good knowledge of the structure and organization of scientific work.

› 5,0 The student knows the structure and organization of scientific work very well.

EU2 Preparation of graduate students to write and defend their thesis.

› 2,0 The student is not able to prepare to write and defend the diploma thesis.

› 3,0 The student is able to prepare partially to write and defend the diploma thesis.

› 3,5 The student is almost able to prepare to write and defend the thesis.

› 4,0 The student is able to prepare well to write and defend the diploma thesis.

› 4,5 The student is able to prepare almost very well to write and defend a diploma thesis.

› 5,0 The student should be very well prepared to write and defend the diploma thesis.

Polish course name	TECHNICZNE PRZYGOTOWANIE PRODUKCJI
English course name	TECHNICAL PREPARATION OF PRODUCTION
Course code	WIP-MDL-D1-TPOP-07
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	7
Number of ECTS points	4
Ways of assessment	Test

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
30		15		15

TEACHERS:

Dr inż. Małgorzata Łągiewka,

Dr inż. Cezary Kolamsiak.

COURSE OBJECTIVES:

- › **C1** Provide students with knowledge in the field of modern manufacturing techniques.
- › **C2.** Acquisition by students of practical skills in the selection of technologies for the production of metals and metal products depending on the type and purpose.

**PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER
COMPETENCES:**

1. Basic knowledge of physics, chemical and materials science.
2. Basic knowledge of basic manufacturing techniques and production processes.
3. Ability to work independently and in a group.
4. Ability to use literature sources and internet resources.

COURSE CONTENT

LECTURE

- › **L1, L2** Manufacturing processes - an introduction.
- › **L3, L4** Organisation of production preparation processes.
- › **L5 - L8** Typical stages of structural production preparation.
- › **L9 - L12** Overall work on technology preparation.
- › **L13 - L16** Technological preparation of production.
- › **L17 - L20** Organisational production preparation.
- › **L21 - L24** Making models, prototypes.
- › **L25 - L28** Types of technology documents.
- › **L29, L30** Production planning.

CLASSES

- › **C1** To familiarise students with the rules for passing the course.
- › **C2** Research and experimental work.
- › **C3** Design of new and improvement of old products.
- › **C4** Preparation of design documentation.
- › **C5** Making prototypes.
- › **C6** Design of new technological processes.
- › **C7** Improvement of existing technological processes.
- › **C8** Design of required tooling and special production equipment.
- › **C9** Participation of technologists in start-up and mastering of new production.
- › **C10** Ongoing maintenance of production.
- › **C11** Development of technical normatives (labour standards, material consumption standards, etc.).
- › **C12** Development of normatives of technical preparation of production - normatives of labour intensity of work.
- › **C13** Labour costs.
- › **C14** Lengthening and shortening the production cycle.
- › **C15** Standardisation - the process of creating and applying uniform standards.

PROJECT

- › **P1, P2** Prepare construction documentation of the selected product.

- › **P3 - P5** Prepare technological documentation of the selected product.
- › **P6, P7** Preparation of normatives of material consumption.
- › **P8, P9** Preparation of normatives of live work.
- › **P10, P11** Develop normatives of material consumption.
- › **P12, P13** Design of technological equipment.
- › **P14, P15** Production implementation.

BASIC REFERENCES

1. T. Lis: Współczesne metody otrzymywania stali, Wyd. Politechniki Śląskiej, Gliwice 2000 r.
2. A. Ghosh: Secondary Steelmaking: Principles and Applications, CRC Press, 2001 r.
3. J. Jowsa: Inżynieria procesów kadziowych w metalurgii stali, Wyd. Pol. Częst., Częstochowa, 2008 r.
4. Y. Sahai, T. Emi: Tundish Technology for Clean Steel Production, World Scientific Press, 2008 r.
5. Botor J. Podstawy metalurgicznej inżynierii procesowej, Wyd. Politechniki Śląskiej, Gliwice, 1999 r.
6. M. Holzer: Procesy metalurgiczne i odlewnicze stopów żelaza. Podstawy fizykochemiczne, Wyd. PWN, Warszawa 2013 r.
7. Blacha L. Metalurgia próżniowa, Wyd. Politechniki Śląskiej, Gliwice 2005 r.
8. A. Kosowski: Podstawy odlewnictwa, Wydawnictwo Naukowe AKAPIT, Kraków, 2008 r.
9. T. Warchała: Technologia modelu i formy. Cz. I i II. Skrypt P.Cz., Częstochowa 1984,1985 r.
10. J.L. Lewandowski: Masy formierskie i rdzeniowe. PWN, Warszawa 1991 r.
11. M. Skarbiński, J. Skarbiński: Technologiczność konstrukcji maszyn. WNT, Warszawa 1987 r.
12. M. Perzyk i inni: Materiały do projektowania procesów odlewniczych”; PWN, Warszawa, 1990 r.
13. A.Tabor, J.S. Rączka: Projektowanie odlewów i technologii form Fotobit, Kraków, 1998 r.

14. W. Gorecki: Inżynieria wytwarzania i przetwórstwa płaskich wyrobów metalowych. Wyd. Politechniki Śląskiej 2006 r.
15. J. Łuksza, A. Skołoszewski, F. Witek, W. Zachariasz: Druty ze stali i stopów specjalnych. Wydawnictwo Naukowo-Techniczne, Warszawa 2006 r.
16. J. Herian: Wybrane techniki wytwarzania wyrobów metalowych. Wydawnictwo Politechniki Śląskiej 2004 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. Poradnik inżyniera. Odlewnictwo tom 1 i 2. Praca zbiorowa. WNT, Warszawa 1986 lub dostępne wydanie.
2. J. Hankus: Budowa i własności mechaniczne lin stalowych. Główny Instytut Górnictwa, Katowice 2000 r.
3. B. Maligowski, M. Pofelski: Wyroby z drutu. Wyd. Śląsk, 1970 r.
4. J. Kasprzak: Liny stalowe. Wyd. Śląsk, 1973 r.

LEARNING OUTCOMES

- › **EU1** The student has a basic knowledge of the processes of producing metals and alloys, casting and plastic forming of metal products.
- › **EU2** The student knows the basic machines, devices and tools for the production of metal products.
- › **EU3** The student is able to use the basic knowledge in the field of technological processes used in the production of metal products to design the finished product.

TEACHING TOOLS

- › Lecture with the use of audiovisual means.
- › Specialist laboratory.
- › Computer software.
- › CUT e-learning platform (possible use).

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

- › **F1.** Assessment of preparation for laboratory classes.
- › **F2.** Assessment of preparation for design classes.
- › **P1.** Assessment of the ability to prepare technological documentation.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures	30	1,2
Seminar		
Classes	15	0,6
Laboratory		
Project	15	0,6
Test		
Exam		
Total contact hours	60	2,4
Student's own work		
Getting acquainted with the indicated literature	10	0,4
Preparation for seminar		
Preparation for classes	10	0,4
Preparation for lab		
Project preparation	10	0,4
Consultation	4	0,16
Preparation for the test	6	0,24
Total student's own work	40	1,6
Total number of hours/ ECTS points for the course	100	4,0

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	Course objectives	Course content	Ways of assessment
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	outcomes defined for whole program			
EU 1	K_W02, K_W07, K_U04, K_U05, K_K02,	C1, C2	L1 - L30 C1 - C15 P1 - P15	F1, F2, P1
EU 2	K_W02, K_W07, K_U04, K_U05, K_K02,	C1, C2	L1 - L30 C1 - C15 P1 - P15	F1, F2, P1
EU 3	K_W02, K_W07, K_U04, K_U05, K_K02,	C1, C2	L1 - L30 C1 - C15 P1 - P15	F1, F2, P1

FORM OF ASSESSMENT - DETAILS

EU1 The student has a basic knowledge of the processes of producing metals and alloys, casting and plastic forming of metal products.

- › 2,0 The student has no basic knowledge of the processes of producing metals and alloys, casting and plastic forming of metal products.
- › 3,0 The student has some knowledge of the processes of producing metals and alloys, casting and plastic forming of metal products.
- › 3,5 The student almost knows the processes of producing metals and alloys, casting and plastic forming of metal products.
- › 4,0 The student knows well the processes of producing metals and alloys, casting and plastic forming of metal products.
- › 4,5 The student knows almost very well the processes of producing metals and alloys, casting and plastic forming of metal products.
- › 5,0 The student knows very well the processes of producing metals and alloys, casting and plastic forming of metal products.

EU2 The student knows the basic machines, devices and tools for the production of metal products.

- › 2,0 The student does not have basic knowledge about machines, devices and tools for the production of metal products.
- › 3,0 The student has some knowledge of machines, devices and tools for the production of metal products.

- › 3,5 Student knows almost about the machines, devices and tools used to manufacture metal products.
- › 4,0 The student knows well the machines, devices and tools for the production of metal products.
- › 4,5 The student knows almost the machines, devices and tools used to manufacture metal products.
- › 5,0 The student knows the machines, devices and tools for the production of metal products very well.

EU3 The student is able to use the basic knowledge in the field of technological processes used in the production of metal products to design the finished product.

- › 2,0 The student is not able to use the knowledge of technological processes used in the production of metal products to design a finished product.
- › 3,0 The student is able to partially use the basic knowledge of technological processes used in the production of metal products to design a finished product.
- › 3,5 The student can almost use the basic knowledge of the technological processes used in the production of metal products to design the finished product.
- › 4,0 The student is able to use the basic knowledge in the field of technological processes used in the production of metal products to prepare the finished product design.
- › 4,5 The student is able to use the basic knowledge in the field of technological processes used in the production of metal products almost very well to perform the design of the finished product
- › 5,0 Student to make good use of the basic knowledge in the field of technological processes used in the production of metal products to design the finished product.

Polish course name	RECYKLING MATERIAŁÓW
English course name	MATERIALS RECYCLING
Course code	WIP-MDL-D1-MR-07
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	7
Number of ECTS points	2
Ways of assessment	Test

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15		30		

TEACHERS:

Dr Bernadeta Gajda,

Dr inż. Artur Hutny,

Dr inż. hab. Adam Cwudziński, prof. PCz.

COURSE OBJECTIVES:

- › **C1** Familiarizing students with the problems of waste management.
- › **C2** Providing students with knowledge of the basic issues related to the engineering of metal recycling processes.
- › **C3** Acquainting students with the recycling techniques of selected materials.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Knowledge of physics and chemistry in the field of physical and chemical properties of metals and non-metallic materials, elementary mathematics.
2. Basic knowledge of materials science.
3. Ability to work independently and in a group.
4. Ability to use literature sources and internet resources.

COURSE CONTENT

LECTURE

- › **L1** The concepts of waste, secondary raw material and recycling. Recycling and minimization of stored solid waste and energy saving. Economic conditions for recycling. Impact on the natural environment.
- › **L2** Classification of metallic waste and multi-material waste. The role and place of metal recycling in the raw material management system. Circular economy.
- › **L3** Equipment used in recycling.
- › **L4** Theoretical basis of pyro and hydrometallurgical processes used in metal recycling.
- › **L5** Recycling of steel and other iron carrier waste. Scrap classification. Equipment used in the recycling of steel waste.
- › **L6** Recycling of production waste.
- › **L7** Modern technologies in aluminum recycling.
- › **L8, L9** Recycling of waste containing critical metals. Recycling of used batteries and accumulators, tin cans, used cell phones.
- › **L10** Problems of waste segregation on the example of municipal waste.
- › **L11** Recycling of paper and glass.
- › **L12, L13** Recycling of plastics. The problems.
- › **L14** Development of end-of-life vehicles.
- › **L15** Alternative fuels.

CLASSES

- › **C1, C2** Methods for determining the chemical composition of waste and recycling products.
- › **C3, C4** Exercises based on the use of differences in the physicochemical properties of materials included in the waste.
- › **C5 - C8** Reminder of the basic chemical calculations used in ›Recycling (percentage, process efficiency).
- › **C9 - C12** Calculations based on chemical reactions occurring in recycling processes. Test.
- › **C13 - C16** Calculations used to prepare solutions of specific concentrations.
C17, C18 Calculations related to the separation of metals from solutions (electrolysis, cementation, precipitation of sparingly soluble compounds).

- › **C19, C20** Analysis of data on the structure of municipal waste in cities, communes and provinces.
- › **C21, C22** Analysis of regulations on segregation of household waste.
- › **C23 - C28** Modern innovative technologies reducing the amount of waste. Review of English-language magazines.
- › **C29, C30** Repetition of material. Test.

BASIC REFERENCES

1. Kucharski M.: Recykling metali nieżelaznych. Wydawnictwa AGH, Kraków 2010 r.
2. Ulewicz M., Siwka J.: Procesy odzysku i recyklingu wybranych Materiałów. Wydawnictwo WIPMiFS Politechniki Częstochowskiej, Częstochowa 2010 r.
3. Ulewicz M: Procesy odzysku i recyklingu metali nieżelaznych i stali. Wydawnictwo Politechniki Częstochowskiej, Częstochowa 2015 r.
4. Rosik-Dulewska Cz.: Podstawy gospodarki odpadami, PWN, Warszawa, 2015 r.
5. Critical Metals, Handbook, Edited by Gus Gunn, Jonh Wiley 2014 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. Free M. L.: Hydrometallurgy- Fundamentals and Applications, Wyd. Wiley, 2013 r.
2. Schmitz Ch.: Handbook of Aluminium Recycling, Wyd. Vulkan-Verlag GmbH, 2006 r.
3. Czasopisma Hydrometallurgy, Waste Management, Recikling, Rudy i mtale nieżelazne - recykling, itp. z ostatnich 5 lat.

LEARNING OUTCOMES

- › **EU1** The student knows the basic principles of waste management and systems Waste management.
- › **EU2** The student knows universal and original technical systems of waste preparation for reuse.
- › **EU3** The student knows the basics of metal recycling technology.
- › **EU4** The student is able to make calculations related to recycling.

TEACHING TOOLS

- › Multimedia presentations.
- › Calculator, periodic table.

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

- › **F1.** Assessment of the implementation of tasks included in the curriculum - colloquium.
- › **F2.** Assessment of self-preparation for tutorials.
- › **P1.** Assessment of the mastery of the teaching material within the lectures - final test.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures	15	0,6
Seminar		
Classes	30	1,2
Laboratory		
Project		
Test	1	0,04
Exam		
Total contact hours	46	1,84
Student's own work		
Getting acquainted with the indicated literature	2	0,08
Preparation for seminar		
Preparation for classes	2	0,08
Preparation for lab		
Project preparation		
Consultation		
Preparation for the exam		
Total student's own work	4	0,16
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_W08, K_U03, K_U09, K_K01,	C1, C3	L1 - L15	P1
EU 2	K_W01, K_U09, K_K01,	C1, C3	L1 - L15	P1
EU 3	K_W01, K_W03, K_U09, K_K01,	C1, C3	L1 - L15	P1
EU4	K_W01, K_W03, K_U03, K_U09, K_K01,	C2	C1 - C30	F1, F2

FORM OF ASSESSMENT - DETAILS

EU1 The student knows the basic principles of waste management and systems waste management.

- › 2,0 The student does not know the basic principles of waste management and systems Waste management.
- › 3.0 The student partially knows the basic principles of waste management and waste management systems.
- › 3.5 The student almost knows the basic principles of waste management and waste management systems.
- › 4,0 Student good. Student knows the basic principles of waste management and waste management systems.

- › 4,5 The student knows almost very well the basic principles of waste management and waste management systems.
- › 5,0 Student knows very well the basic principles of waste management and waste management systems.

EU2 The student knows universal and original technical systems of waste preparation for reuse.

- › 2,0 The student does not know universal and original technical systems of waste preparation for reuse.
- › 3,0 The student is partially familiar with the universal and original technical systems of waste preparation for reuse.
- › 3,5 The student almost knows the universal and original technical systems of waste preparation for reuse.
- › 4,0 The student knows well the universal and original technical systems of waste preparation for reuse.
- › 4,5 The student knows almost very well the universal and original technical systems of waste preparation for reuse.
- › 5,0 The student knows the universal and original technical systems of waste preparation for reuse very well.

EU3 The student knows the basics of metal recycling technology.

- › 2,0 The student does not know the basics of metal recycling technology.
- › 3,0 The student knows the basics of metal recycling technology.
- › 3,5 The student knows the basics of metal recycling technology.
- › 4,0 The student knows the basics of metal recycling technology well.
- › 4,5 The student knows almost very well the basics of metal recycling technology.
- › 5,0 The student knows the basics of metal recycling technology very well.

EU4 The student is able to make calculations related to recycling.

- › 2,0 The student is not able to make calculations related to recycling.
- › 3,0 The student is able to partially make calculations related to recycling.
- › 3,5 The student is almost able to make calculations related to recycling.
- › 4,0 The student is able to do calculations related to recycling well.
- › 4,5 The student is able to make calculations related to recycling almost very well.
- › 5,0 The student can make calculations related to recycling very well.

Polish course name	PROJEKTOWANIE ZABEZPIECZEŃ ANTYKOROZYJNYCH
English course name	ANTI-CORROSION PROTECTIVE DESIGN
Course code	WIP-MDL-D1-ACPD-07
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	7
Number of ECTS points	2
Ways of assessment	Test

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15			15	

TEACHERS:

Dr inż. Karina Jagielska-Wiaderek,

Dr Edyta Owczarek,

Dr hab. Krystyna Giza, prof. PCz.

COURSE OBJECTIVES:

- › **C1** Providing students with knowledge in the field of designing anti-corrosion protection and painting systems.
- › **C2** Acquisition by students of the ability to work with standards in the field of anti-corrosion protection.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Basic knowledge of chemistry, mathematics and electrical engineering.
2. Ability to work independently and in a group.
3. Ability to use literature sources and internet resources.

COURSE CONTENT

LECTURE

- › **L1** Design process: function, material, shape and manufacturing method.
- › **L2, L3** Basics of corrosion phenomena. Types of corrosion damage and their effects.
- › **L4** Electrochemical corrosion: mechanism and prevention.
- › **L5, L6** Requirements for: proper design of the structure, environmental protection, corrosion protection contractor.
- › **L7** Protective properties of varnish products.
- › **L8** Coating systems for steel structures.
- › **L9, L10** Influence of surface contamination on the quality of coatings. Ways of surface preparation.
- › **L11** Anti-corrosion protection technologies.
- › **L12, L13** Standards related to anti-corrosion protection.
- › **L14** Defects of paints and anti-corrosion coatings, standardisation in the assessment of degradation of coatings.
- › **L15** Protection of steel-concrete connections.

LABORATORY

- › **Lab1, Lab2** To acquaint students with the rules of passing the subject and the rules of occupational health and safety in the laboratory. Construction of the areological system.
- › **Lab3, Lab4** Methods of surface preparation for protective coatings.
- › **Lab5, Lab6** Protective properties of varnish products.
- › **Lab7, Lab8** Anti-corrosion layers after various forming techniques.
- › **Lab9, Lab10** Examination of geometrical parameters and tribological properties of protective layers.
- › **Lab11, Lab12** Defects of paints and coatings, destruction of coatings.
- › **Lab13 - Lab15** Modification of the surface of products in industrial practice - field trips.

BASIC REFERENCES

1. H. Bala, Korozja Materiałów – Teoria i Praktyka, Wydawnictwo WIPMiFS, Częstochowa.
2. J. Baszkiewicz, M. Kamiński, Podstawy Korozji materiałów, Ofic. Wyd. PW, Warszawa 2006 r.

3. Przewodnik po ochronie przeciwkorozyjnej powierzchni stalowych – TEKNOS.
4. A. Chmielewski - Zabezpieczenie przeciwkorozyjne konstrukcji stalowych, Wrocław 1997 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. K. Jagielska-Wiaderek, Głębokościowa charakterystyka odporności korozyjnej azotowanego stopu Ti6Al4V, Ochrona przed Korozją, Vol.64, nr 2, 34-37 (2021).
2. Norma PN-EN-ISO-12944.

LEARNING OUTCOMES

- › **EU1** The student has theoretical knowledge of corrosion and corrosion protection design, knows the terminology of terms and terms in this area.
- › **EU2** The student knows the general principles of selecting paint systems for steel structures.
- › **EU3** The student is able to carry out appropriate tests to determine the effectiveness of anti-corrosion protection, analyse the results and prepare a test report.

TEACHING TOOLS

- › Multimedia presentations.
- › Manuals, scripts.
- › Laboratory equipment and guides.

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

- › **F1.** Assessment of the preparation of laboratory reports.
- › **F2.** Assessment of the mastery of the teaching material being the subject of laboratory exercises - final colloquium.
- › **P1.** Assessment of the mastery of the teaching material within the lectures - final colloquium.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures	15	0,6
Seminar		
Classes		
Laboratory	15	0,6
Project		
Test	2	0,08
Exam		
Total contact hours	32	1,28
Student's own work		
Getting acquainted with the indicated literature	5	0,2
Preparation for seminar		
Preparation for classes		
Preparation for lab	5	0,2
Project preparation		
Consultation	4	0,16
Preparation for the test	4	0,16
Total student's own work	18	0,72
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_W04, K_K01,	C1,C2	L1 - L15	P1
EU 2	K_W01, K_W03, K_U03, K_U04, K_K02,	C1,C2	L1 - L15, Lab1 - Lab15	F1, F2, P1
EU 3	K_W03, K_U03, K_K03,	C1,C2	Lab1 - Lab15	F1, F2

FORM OF ASSESSMENT - DETAILS

EU1 The student has theoretical knowledge of corrosion and corrosion protection design, knows the terminology of terms and terms in this area.

- › 2,0 The student doesn't have theoretical knowledge of corrosion and corrosion protection design, knows the terminology of terms and terms in this area.
- › 3,0 The student has partially theoretical knowledge of corrosion and corrosion protection design, knows the terminology of terms and terms in this area.
- › 3,5 The student has almost theoretical knowledge of corrosion and designing anti-corrosion protection, partially knows the terminology of terms and terms in this area.
- › 4,0 The student has a good theoretical knowledge of corrosion and corrosion protection design, knows the terminology of terms and terms in this field well.
- › 4,5 The student has an almost good theoretical knowledge of corrosion and corrosion protection design, knows the terminology of terms and terms in this field well.
- › 5,0 The student has very good theoretical knowledge of corrosion and designing anti-corrosion protection, knows the terminology of terms and terms in this field.

EU2 The student knows the general principles of selecting paint systems for steel structures.

- › 2,0 The student doesn't know the general principles of selecting paint systems for steel structures.
- › 3,0 The student partially knows the general principles of selecting paint systems for steel structures.
- › 3,5 The student almost knows the general principles of selecting paint systems for steel structures.
- › 4,0 The student knows the general principles of selecting paint systems for steel structures well.
- › 4,5 The student knows the general principles of selecting paint systems for steel structures almost very well.
- › 5,0 The student knows the general principles of selecting paint systems for steel structures very well.

EU3 The student is able to carry out appropriate tests to determine the effectiveness of anti-corrosion protection, analyse the results and prepare a test report

- › 2,0 The student isn't able to carry out appropriate tests to determine the effectiveness of anti-corrosion protection, analyse the results and prepare a test report.
- › 3,0 The student is partially able to carry out appropriate tests to determine the effectiveness of anti-corrosion protection, analyse the results and prepare a test report.
- › 3,5 The student is almost able to carry out appropriate tests in order to determine the effectiveness of anti-corrosion protection, analyse the results and prepare a report on the research carried out .
- › 4,0 The student is able to carry out appropriate tests in order to determine the effectiveness of anti-corrosion protection, analyse the results and prepare a report on the research carried out well.
- › 4,5 The student is able to carry out the appropriate tests to determine the effectiveness of anti-corrosion protection, analyse the results and prepare a report on the tests carried out almost very well.
- › 5,0 The student is able to carry out the appropriate tests to determine the effectiveness of anti-corrosion protection, analyse the results and prepare a report on the tests carried out very well.

Polish course name	LOGISTYKA MIĘDZYNARODOWA
English course name	INTERNATIONAL LOGISTICS
Course code	WIP-MDL-D1-IL-07
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	7
Number of ECTS points	2
Ways of assessment	Test

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15		15		

TEACHERS:

Dr Anna Budzik.

COURSE OBJECTIVES:

- › **C1** Presentation and discussion of the impact of globalization and internationalization processes on changes taking place in logistic systems.
- › **C2** Characterization of international logistics systems. Showing the possibilities and conditions of shaping logistics processes in an international perspective.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. The student should have an established knowledge in the field of logistics.
2. The student has knowledge of globalization.
3. Ability to use literature sources and internet resources.

COURSE CONTENT

LECTURE

- › **L1, L2** The essence and importance of international logistics
- › **L3, L5** Logistics processes and activities carried out on an international scale.
- › **L6** International logistics infrastructure.

- › **L7, L8** Transport rules and procedures.
- › **L9, L10** Enterprises and institutions participating in the implementation of processes and logistics activities on an international scale.
- › **L11** International supply chains.
- › **L12, L13** Intermodal transport in international logistics.
- › **L14, L15** Information technology in international logistics management.

CLASSES

- › **C1** Introductory classes to the subject.
- › **C2, C3** Presentation of examples of problems related to the implementation of logistic operations on a global scale - analysis of a case study.
- › **C4** Overview of work to be done in task teams.
- › **C5, C6, C7, C8, C9** Working in teams - a case study on logistics processes and activities carried out on a global scale on chosen example.
- › **C10, C11** Presentation of students' works.
- › **C12, C13** Discussions about the effects, costs, possibilities of introducing an alternative solution than presented in the case studies.
- › **C13, C14** Summary of presentations and evaluation of students' work.
- › **C15** Summary of the course content and knowledge verification.

BASIC REFERENCES

1. Logistyka międzynarodowa w zmiennych warunkach gospodarki światowej Red. nauk. E. Gołemska, Zb. Bentyn, Wydaw. Uniwersytetu Ekonomicznego, Poznań 2014 r.
2. E. Gołemska, Logistyka międzynarodowa: aktualne trendy rozwoju, najnowsze wyniki badań, sprawdzone metody zarządzania, Wydaw. Nauk. PWN, Warszawa 2014 r.
3. Gospodarcze konsekwencje rozwoju logistyki międzynarodowej, red. nauk. E. Gołemska, Zb. Bentyn, Wydaw. Uniwersytetu Ekonomicznego, Poznań 2014 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. Czasopismo Logistyka.
2. Czasopismo Gospodarka Materiałowa i Logistyka.

3. A. Budzik, T. Budzik, External Effects of Transport Activities on the Example of Poland and the European Union, Transport Means 2019. Sustainability: Research and Solutions (red.) OSTASEVICIUS Vytautas.
4. Logistyka międzynarodowa wyzwaniem dla gospodarki światowej / Red. Elżbieta Gołemska, Zbigniew Bentyn Zeszyty Naukowe (Uniwersytet Ekonomiczny w Poznaniu) Poznań: Wydaw. Uniwersytetu Ekonomicznego, 2012 r.

LEARNING OUTCOMES

- › **EU1** The student is able to discuss international logistics systems and understands the importance of processes globalization.
- › **EU2** The student identifies and discusses logistics processes carried out on an international scale.
- › **EU3** The student knows international transport regulations.
- › **EU4** The student is able to characterize and discuss entities implementing logistics processes and activities on an international scale.

TEACHING TOOLS

- › Multimedia presentations.
- › Manuals, scripts.
- › Case- study.
- › E-learning platform (possible use).

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

- › **F1.** Assessment of work during classes
- › **P1.** Assessment of the mastery of the teaching material within the lectures - final 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	1	0,04
Exam		
Total contact hours	31	1,24
Student's own work		
Getting acquainted with the indicated literature	6	0,24
Preparation for seminar		
Preparation for classes	7	0,28
Preparation for lab		
Project preparation		
Consultation	3	0,12
Preparation for the test	3	0,12
Total student's own work	19	0,76
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_W02, K_W06,	C1	L1, L2, L3, C1	P1

	K_U05, K_U07, K_U09, K_K03, K_K02,			
EU 2	K_W02, K_W06, K_U05, K_U07, K_U09, K_K03, K_K02,	C1	L4, L5, L6, C2, C3	P1
EU 3	K_W02, K_W06, K_U05, K_U07, K_U09, K_K03, K_K02,	C1	L7, L8, L9, L10, C4 - C11	P1, F1
EU4	K_W02, K_W06, K_U05, K_U07, K_U09, K_K03, K_K02,	C2	L11, L12, L13, L14, L15, C4 - C15	P1, F1

FORM OF ASSESSMENT - DETAILS

EU1 The student is able to describe international logistic systems and understands the importance of globalization processes.

- › 2,0 The student is not able to discuss international logistics systems.
- › 3,0 Student is able to partially describe international logistic systems.
- › 3,5 The student can almost describe international logistics systems.

- › 4,0 The student is able to describe international logistics systems well. Student knows the importance of globalization processes.
- › 4,5 Student has a good understanding of international logistics systems. He knows the importance of globalization processes and can almost discuss them.
- › 5,0 The student knows the international logistics systems very well. He knows the importance of globalization processes and is very good at discussing them.

EU2 The student identifies and discusses logistics processes carried out on an international scale.

- › 2,0 The student does not identify logistics processes carried out on an international scale.
- › 3,0 The student partially identifies logistics processes carried out on an international scale.
- › 3,5 The student almost identifies logistic processes carried out on an international scale.
- › 4,0 The student has a good identification of logistics processes carried out on an international scale.
- › 4,5 The student almost very well identifies logistics processes carried out on an international scale.
- › 5,0 The student very well identifies logistics processes carried out on an international scale.

EU3 The student knows the international transport regulations.

- › 2,0 The student is not able to name international transport regulations.
- › 3,0 The student is able to partially list and discuss international transport regulations.
- › 3,5 The student can almost list and discuss international transport regulations
- › 4,0 The student is able to name and discuss international transport regulations well.
- › 4,5 The student is well able to list and discuss international transport regulations.
- › 5,0 The student is very good at listing and discussing international transport regulations.

EU4 The student is able to characterize and discuss entities implementing logistics processes and activities on an international scale.

- › 2,0 The student is not able to characterize and discuss entities implementing logistics processes and activities on an international scale.
- › 3,0 The student is able to characterize and discuss entities carrying out logistic processes and activities on an international scale.
- › 3,5 The student is almost able to characterize and discuss entities carrying out logistic processes and activities on an international scale.
- › 4,0 The student is able to characterize and discuss entities carrying out logistic processes and activities on an international scale.
- › 4,5 The student is well able to characterise and discuss the actors carrying out logistics processes and activities on an international scale.
- › 5,0 The student is very good at characterizing and discussing entities implementing logistics processes and activities on an international scale.

Polish course name	DEGRADACJA MATERIAŁÓW
English course name	DEGRADATION OF MATERIALS
Course code	WIP-MDL-D1-DOM-07
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	7
Number of ECTS points	3
Ways of assessment	Test

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
30			30	

TEACHERS:

Dr Edyta Owczarek,
 Dr inż. Karina Jagielska-Wiaderek,
 Dr hab. Krystyna Giza, prof. PCz.

COURSE OBJECTIVES:

- › **C1** The aim is to familiarize students with the phenomena of material degradation and selected technologies of protection against material degradation.
- › **C2** Acquiring by students the ability to assess the degree of degradation of materials

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Basic knowledge of chemistry, mathematics, materials science, engineering materials.
2. Ability to keep documentation and prepare a report on the course of the exercise.
3. Ability to use literature sources and internet resources

COURSE CONTENT

LECTURE

- › **L1, L2** Durability of materials in natural and artificial environments. Factors causing degradation of materials. Types of material degradation.
- › **L3 - L5** Classification of corrosion phenomena and destruction of materials. Types of corrosion damage and their effects. Methods of expressing the corrosion rate. Chemical corrosion of metals.
- › **L6 - L12** Electrochemical corrosion of metallic materials.
- › **L13 - L15** Corrosion of ceramic materials.
- › **L16 - L17** Selected technologies to prevent corrosion degradation.
- › **L18 - L22** Degradation by tribological wear (abrasive, abrasion, fatigue, abrasive-adhesive, adhesive, oxidation, hydrogen).
- › **L23 - L27** Degradation by non-tribological wear (thermal, diffusion, deformation, erosion, cavitation and others).
- › **L28, L29** Biodegradation.
- › **L30** Final test.

Laboratory

- › **Lab1, Lab2** Acquainting students with the rules of passing the course. Health and safety rules in the research laboratory. Physicochemical properties of solids.
- › **Lab3 - Lab6** Determination of the corrosion rate of metallic materials in environments of various aggressiveness.
- › **Lab7 - Lab10** Research on the degradation of materials in the biological environment.
- › **Lab11 - Lab14** Influence of non-metallic coatings on the corrosion resistance of materials in various environments.
- › **Lab15 - Lab18** Research on the influence of the geometrical structure of the surface of materials on their strength.
- › **Lab19 - Lab22** Assessment of surface resistance to wear under frictional conditions.
- › **Lab23 - Lab26** Assessment of scratch resistance.
- › **Lab27 - Lab30** Microscopic evaluation of the type and degree of degradation of selected materials.

BASIC REFERENCES

1. T. Burakowski, T. Wierzchoń: Inżynieria powierzchni metali. WNT, Warszawa 1995 r.
2. L. A. Dobrzański: Materiały inżynierski i projektowanie materiałowe. Podstawy nauki o materiałach i metaloznawstwo. WNT, Warszawa 2006 r.
3. J. Łaskawiec: Inżynieria Powierzchni. Wydawnictwo Politechniki Śląskiej, Gliwice 1997 r.
4. T. Hryniewicz., Rokosz K.: Podstawy teoretyczne i aspekty praktyczne zjawisk korozji, Wyd. UPK, Koszalin, 2010 r.
5. W. Gumowska, E. Rudnik, I. Harańczyk: Korozja i ochrona metali, Wyd. naukowo-dydaktyczne AGH, Kraków, 2007 r.
6. M. Blicharski: Wstęp do inżynierii materiałowej, WNT 2009 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. Owczarek E.: Methods of modifying anticorrosive protective properties of silane films, Acta Physica Polonica A, (2019) 135 (2):147-152.
2. Owczarek E.: Comparision studies of the protective properties of silane/polyrhodanine and polyrhodanine/silan bilayer coatings applied on stainless steel, Anti-Corrosion Methods and Materials, (2018) 65:190-196.

LEARNING OUTCOMES

- › **EU1** The student has a basic knowledge of the mechanisms and effects of material degradation.
- › **EU2** The student is able to carry out appropriate tests of the degree of degradation of the material and, on the basis of the obtained results, make an analysis and prepare a report on the conducted research.

TEACHING TOOLS

- › Lecture with the use of audiovisual aids.
- › Instructions for laboratory exercises. The laboratory is equipped with measuring apparatus and a microscope for observation of damages.

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

- › **F1.** Assessment of the implementation of tasks included in the curriculum.

- › **F2.** Assessment of the preparation of laboratory reports.
- › **P1.** Assessment of the mastery of the teaching material being the subject of the laboratory - final test.
- › **P2.** Assessment of the mastery of the teaching material within the lectures - 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		
Preparation for classes		
Preparation for lab	6	0,24
Project preparation		
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
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Information about the consultation (time + place)	https://wip.pcz.pl/dla-studentow/konsultacje-dla-studentow
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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_W04, K_U03, K_U04,	C1	L1 - L30	F1, P2
EU 2	K_W01, K_W04, K_U03, K_U04,	C1, C2	L1 - L30, Lab1 - Lab30	F1, F2, P1

FORM OF ASSESSMENT - DETAILS

EU1 The student has a basic knowledge of the mechanisms and effects of material degradation.

- › 2,0 The student has no basic knowledge about the mechanisms and effects of material degradation.
- › 3,0 The student partially has a basic knowledge of the mechanisms and effects of material degradation.
- › 3,5 The student has almost a basic knowledge of the mechanisms and effects of material degradation.
- › 4,0 The student knows the mechanisms and effects of material degradation well.
- › 4,5 The student knows the mechanisms and effects of material degradation almost very well.
- › 5,0 The student knows the basic knowledge about the mechanisms and effects of material degradation very well.

EU2 The student is able to carry out appropriate tests of the degree of degradation of selected materials and, on the basis of the obtained results, make an analysis and prepare a report on the conducted research.

- › 2,0 The student is not able to carry out an appropriate examination of the degree of degradation of selected materials and, on the basis of the obtained results, make an analysis and prepare a report on the research carried out.

- › 3,0 The student is able to partially carry out appropriate tests of the degree of degradation of selected materials and, on the basis of the obtained results, make an analysis and prepare a report on the research.
- › 3,5 The student is able to almost carry out appropriate tests of the degree of degradation of selected materials and, on the basis of the obtained results, make an analysis and prepare a report on the research carried out.
- › 4,0 The student is able to carry out appropriate research on the degree of degradation of selected materials and, on the basis of the obtained results, make an analysis and prepare a report on the research.
- › 4,5 The student is able to carry out the appropriate tests of the degree of degradation of selected materials very well, and on the basis of the obtained results, make an analysis and prepare a report on the conducted research.
- › 5,0 The student is very well able to carry out appropriate research on the degree of degradation of selected materials and, on the basis of the obtained results, make an analysis and prepare a report on the research.

Polish course name	LOGISTYCZNE SYSTEMY INFORMATYCZNE W PRZEDSIĘBIORSTWACH PRODUKCYJNYCH
English course name	LOGISTIC IT SYSTEMS IN MANUFACTURING COMPANIES
Course code	WIP-MDL-D1-LISIM-07
Field of study	MATERIALS DESIGN AND LOGISTICS
Level of qualification	First degree
Form of study	Full-time
Semester	7
Number of ECTS points	2
Ways of assessment	Test

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15		30		

TEACHERS:

Dr inż. Damian Dziembek,

Dr inż. Tomasz Turek,

Dr inż. Leszek Ziora,

Dr inż. Andrzej Chluski,

Dr inż. Ilona Pawełszek.

COURSE OBJECTIVES:

- › **C1** Providing students with knowledge in the field of logistic IT systems supporting production enterprises.
- › **C2** Obtaining by the students the practical skills in the field of use of modern IT systems supporting logistics in manufacturing companies.

**PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER
COMPETENCES:**

1. Basic knowledge of the basics of computer science and the basics of information technology.

2. Ability to use literature sources and internet resources.
3. Basic knowledge of logistics and logistics processes.
4. Ability to work independently and in a group.

COURSE CONTENT

LECTURE

- › **L1** Structural and process approach to a production enterprise.
- › **L2, L3** Logistics information systems.
- › **L4 - L6** ERP class IT systems.
- › **L7, L8** Evolution of ERP systems.
- › **L9 - L11** Effects and barriers to implementing ERP systems.
- › **L12** WMS systems.
- › **L13** SCM systems.
- › **L14, L15** Organization of logistic IT systems implementation works.

CLASSES

- › **C1, C2** Introductory classes, organizational issues, rules for performing laboratory exercises, rules of the computer lab. Presentation of the ERP system. Presentation of other IT systems supporting logistics (e.g. WMS, SCM, TMS, GIS).
- › **C3, C4** General presentation of ERP class systems supporting logistic processes, available at the Management Department (SAP, Macrologic MERIT).
- › **C5, C6** Installation and configuration of an ERP class system, setting access rights, identifiers and passwords.
- › **C7, C8** General characteristics of the selected ERP system (SAP or Macrologic MERIT).
- › **C9, C10** Rules for creating contractor dictionaries as well as dictionaries of materials and services. Completing data in dictionaries.
- › **C11, C12** Rules for creating offers and orders in the ERP system. Creation of sample offers and orders.
- › **C13, C14** Basics of warehouse management in the ERP system.
- › **C15, C16** Rules for creating delivery orders. Create a supply order.
- › **C17, C18** Supply in ERP systems. Acceptance of goods at the warehouse. Purchasing documents. Storage documents.

- › **C19** Order processing rules. Issuing a sales document and a warehouse document.
- › **C20** Basics of production logistics. Principles of creating technology for products. Creation of technology in the ERP system.
- › **C21, C22** Rules for creating production guides (orders). Creation of an order in the ERP system.
- › **C23, C24** Raw material order, raw material release for an order. Generating warehouse documents in the ERP system.
- › **C25** Rules for creating production reports. Generating a report in the ERP system.
- › **C26, C27** Presentation of the capabilities of WMS class systems and other selected applications supporting logistics processes. Basic system operation, registration of activities included in logistics processes. Checking the correctness of the entered data.
- › **C28, C29** Presentation of the capabilities of SCM class systems supporting logistic processes. Basic system operation, registration of activities included in logistics processes. Checking the correctness of the entered data.
- › **C30** Summary of laboratory classes. Verification of works. Issuing final grades.

BASIC REFERENCES

1. Dziembek D.: Integrated ERP-Class Management Information Systems – Evolution, Current State and Development Directions, Problemy Zarządzania, Volume 19, No. 3(93), 2021 r.
2. Dziembek D., Turek T.: The ERP Process System as a Direction of The Evolution of Integrated Management Information Systems, Business Informatics 3(49), 2018 r.
3. Majewski J.: Informatyka dla logistyki, Wydawnictwo Instytut Logistyki i Magazynowania Poznań, 2008 r.
4. Chaberek M., Jezierski A.: Informatyczne narzędzia procesów logistycznych, Wydawnictwo CEDEWU, 2010 r.
5. Szymonik A.: Technologie informatyczne w logistyce, Placet 2010 r.
6. Nowicki A., Chomiak-Orsa I. (red.): Analiza i modelowanie systemów informacyjnych, Wyd. UE we Wrocławiu, Wrocław 2011 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. Długosz J.: Nowoczesne technologie w logistyce, PWE Warszawa, 2009 r.
2. Murphy P.: Nowoczesna logistyka, Helion, Gliwice 2011 r.

LEARNING OUTCOMES

- › **EU1** Student has a basic theoretical knowledge of the role and importance of logistic information systems in manufacturing companies.
- › **EU2** Student is able to use logistic IT systems in the field of recording and monitoring the course of logistic processes and related economic operations taking place in production companies.

TEACHING TOOLS

- › Multimedia presentations.
- › Laboratory equipment and guides.
- › Computer stations with software (Merit, SAP, LSI in cloud).

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

- › **F1.** Assessment of the implementation of tasks included in the curriculum.
- › **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 lectures - final test.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures	15	0,6
Seminar		
Classes	30	1,2
Laboratory		
Project		
Test		
Exam		
Total contact hours	45	1,8

Student's own work		
Getting acquainted with the indicated literature	2	0,08
Preparation for seminar		
Preparation for classes	2	0,08
Preparation for lab		
Project preparation		
Consultation	1	0,04
Preparation for the exam		
Total student's own work	5	0,2
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_W02, K_W07, K_W06, K_U04, K_U05, K_U07, K_K02,	C1	L1 - L15	P1
EU 2	K_W02, K_W07, K_W06, K_U04, K_U05, K_U07, K_K02,	C2	C1 - C30	F1, F2

FORM OF ASSESSMENT - DETAILS

EU1 Student has a basic theoretical knowledge of the role and importance of logistic information systems in manufacturing companies.

- › 2,0 Student does not know the basic rules regarding the role and importance of logistic IT systems in a production company.
- › 3,0 Student partially knows the basic rules regarding the role and importance of logistic information systems in a production company.
- › 3,5 Student almost knows the basic rules regarding the role and importance of logistic IT systems in a production company.
- › 4,0 Student knows the rules regarding the role and importance of logistic IT systems in a production company.
- › 4,5 Student knows almost very well the rules regarding the role and importance of logistic IT systems in a production company.
- › 5,0 Student knows very well the basic rules regarding the role and importance of logistic IT systems in a production company.

EU2 Student is able to use logistic IT systems in the field of recording and monitoring the course of logistic processes and related economic operations taking place in production companies.

- › 2,0 Student is not able to use logistic IT systems in the field of recording and monitoring the course of logistics processes and related economic operations taking place in production companies.
- › 3,0 Student is able to partially use logistic IT systems in the field of recording and monitoring the course of logistic processes and related economic operations taking place in production companies.
- › 3,5 Student can almost use logistic IT systems in the field of recording and monitoring the course of logistics processes and related economic operations taking place in production companies.
- › 4,0 Student is able to use logistic IT systems well in the field of recording and monitoring the course of logistic processes and related economic operations taking place in production companies.
- › 4,5 Student is able to use logistic IT systems very well in the field of recording and monitoring the course of logistics processes and related economic operations taking place in production companies.

- › 5,0 Student very well uses logistic IT systems in the field of recording and monitoring the course of logistics processes and related economic operations taking place in production companies.

Polish course name	INFORMATYZACJA PROCESÓW TRANSPORTOWYCH I MAGAZYNOWYCH
English course name	COMPUTERIZATION OF TRANSPORT AND WAREHOUSE PROCESSES
Course code	WIP-MDL-D1-COTAW-07
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	7
Number of ECTS points	2
Ways of assessment	Exam

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15			30	

TEACHERS:

Dr inż. Rafał Niedbał.

COURSE OBJECTIVES:

- › **C1** Introducing students with the principles of computerization of transport and warehouse processes in the enterprise.
- › **C2** Introducing students with IT and economic instruments supporting the planning of IT infrastructure in warehouses.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Basic knowledge of logistics.
2. Knowledge and skills in the field of functioning of enterprises in which there are transport and warehouse processes.
3. Knowledge of the functionality of ERP-class IT systems oriented on the efficiency of logistics processes.

COURSE CONTENT

LECTURE

- › **L1** Organizational classes, familiarizing students with work in the e-learning mode.
- › **L2** Basic concepts: warehouse processes, transport processes, computerization of warehouse and transport processes, logistic IT system.
- › **L3** The use of UML in modeling information systems supporting logistic management in an enterprise - a use case diagram, documentation of use cases.
- › **L4** The use of UML in modeling information systems supporting logistic management in an enterprise - class diagram.
- › **L5** Sectors determining the development of logistics versus IT in logistics. The use of information and telecommunications technologies in warehouse logistics.
- › **L6** Development line of IT systems supporting logistic management in the enterprise. Logistic IT system of MRP class - Material Requirements Planning.
- › **L7** Logistics IT system of ERP class - Enterprise Resources Planning.
- › **L8** Warehouse Management Systems - WMS. Mobile WMS and WCS systems.
- › **L9, L10** The selection and implementation of technology in warehouse management on the example of a Warehouse Management System. An example of the functionality of the WMS system.
- › **L11** Supply Chain Management systems - SCM.
- › **L12** Electronic data interchange.
- › **L13** GS1 Global Identification System.
- › **L14, L15** Directions of using cloud computing in logistics.

LABORATORY

- › **Lab1, Lab2** Introductory laboratory classes - making acquainted with conditions of obtaining credit in the subject.
- › **Lab3, Lab4** Analysis of the current state of computerization of warehouse and transport processes in the enterprise.
- › **Lab5 - Lab10** Analysis of transport and warehouse processes in the enterprise before the implementation of the IT system - creating flowcharts.

- › **Lab11, Lab12** Analysis of the possibilities of improving the functioning of warehouse and transport processes in the enterprise with the use of selected IT technologies.
- › **Lab13 – Lab16** Designing computerization of warehouse and transport processes of the enterprise. Pre-implementation analysis - analysis of system user requirements, analysis of IT infrastructure.
- › **Lab17 - Lab18** Modeling of the IT system supporting the management of warehouse and transport processes - creating a use case diagram.
- › **Lab19 - Lab22** Modeling of the IT system supporting the management of warehouse and transport processes - creating documentation of use cases.
- › **Lab23 - Lab26** Modeling of the IT system supporting the management of warehouse and transport processes - creating a class diagram.
- › **Lab27 - Lab30** Presentation, discussion of projects and their evaluation.

BASIC REFERENCES

1. Ocicka B. (red.) (2018), Technologie mobilne w logistyce i zarządzaniu łańcuchem dostaw, Warszawa: Wydawnictwo Naukowe PWN.
2. Wieczerzycki W. (red.) (2012), E-Logistyka, Warszawa: Polskie Wydawnictwo Ekonomiczne.
3. Wrycza S., Marcinkowski B., Maślankowski J. (2012), UML 2.x. Ćwiczenia zaawansowane, Helion, Gliwice.
4. Szymonik A. (2010), Technologie informatyczne w logistyce, Warszawa, Wydawnictwo PLACET.
5. Ficoń K. (2009), Logistyka techniczna: infrastruktura logistyczna, Warszawa BEL Studio, 2009.

SUPPLEMENTARY REFERENCE MATERIALS

1. Niemczyk A. (2010), Zarządzanie magazynem, Poznań: Wyższa Szkoła Logistyki.
2. Wrycza S., Bartosz Marcinkowski B., Wyrzykowski K. (2005), Język UML 2.0 w modelowaniu systemów informatycznych, Wydawnictwo HELION, Gliwice.
3. Kudelska I., Niedbał R. (2020), Technological and Organizational Innovation in Warehousing Process - Research Over Workload of Staff and Efficiency of Picking Stations, *Ekonomie a Management*, Vol.23, Iss.3, s. 67-81, URL:

<http://147.230.18.117/handle/15240/157481>, DOI: 10.15240/tul/001/2020-3-005.

4. Kudelska I., Niedbał R. (2021), The Impact of Organizational Change on the Improvement of the Picking Process in a Logistics Center - a Case Study, European Research Studies Journal, Vol.24, Iss.2B, s. 882-892. URL: <https://www.ersj.eu/journal/2297>, DOI: 10.35808/ersj/2297.

LEARNING OUTCOMES

- › **EU1** Student has basic knowledge in the field of computerization of transport and warehouse processes in the enterprise.
- › **EU2** Student describes IT and economic instruments supporting warehouse management.
- › **EU3** Student characterizes the methods of planning the development of IT infrastructure in transport bases and warehouses.
- › **EU4** Student has basic knowledge of the effectiveness of logistics processes in terms of processes.

TEACHING TOOLS

- › Lecture with the use of audiovisual equipment/E-learning platform.
- › Laboratory - desktop computers with access to the Internet.
- › Standard Microsoft Office software.
- › Free software available at: <https://app.diagrams.net/>.

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

- › **F1.** Assessment of the implementation of tasks included in the course guide.
- › **F2.** Assessment of reports from laboratory classes.
- P1.** Assessment of the mastery of the teaching material during lectures and laboratories - examination in the form of a test.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures	15	0,6
Seminar		
Classes		
Laboratory	30	1,2
Project		
Test		
Exam	2	0,08
Total contact hours	47	1,88
Student's own work		
Getting acquainted with the indicated literature		
Preparation for seminar		
Preparation for classes		
Preparation for lab		
Project preparation		
Consultation	2	0,08
Preparation for the exam	1	0,04
Total student's own work	3	0,12
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_U04, K_U05, K_K01, K_K02,	C1	L1 - L15, Lab1 - Lab30	P1, F2
EU 2	K_W01, K_W02, K_W07, K_U05, K_U07, K_K01, K_K02,	C2	L1 - L15, Lab1 - Lab30	P1, F2
EU 3	K_W01, K_W02, K_W05, K_U04, K_U05, K_K01, K_K02,	C1, C2	L1 - L15, Lab1 - Lab30	P1, F1, F2
EU 4	K_W01, K_W02, K_W06, K_U04, K_U05, K_K01, K_K02,	C1, C2	L1 - L15, Lab1 - Lab30	P1, F1, F2

FORM OF ASSESSMENT - DETAILS

EU1 Student has basic knowledge in the field of computerization of transport and warehouse processes in the enterprise.

- › 2,0 Student has no knowledge of the computerization of transport and warehouse processes in the enterprise.
- › 3,0 Student only partially knows the basic knowledge in the field of computerization of transport and warehouse processes in the enterprise.
- › 3,5 Student almost knows the basic knowledge in the field of computerization of transport and warehouse processes in the enterprise.
- › 4,0 Student knows the basic knowledge in the field of computerization of transport and warehouse processes in the enterprise.

- › 4,5 Student knows almost very well the basic knowledge in the field of computerization of transport processes in the enterprise.
- › 5,0 Student knows very well the basic knowledge in the field of computerization of transport processes in the enterprise.

EU2 Student describes IT and economic instruments supporting warehouse management.

- › 2,0 Student does not know any IT and economic tools supporting warehouse management.
- › 3,0 Student partially knows the IT and economic instruments supporting warehouse management.
- › 3,5 Student almost knows the IT and economic instruments supporting warehouse management.
- › 4,0 Student knows the IT and economic instruments supporting warehouse management well.
- › 4,5 Student knows almost very well the IT and economic instruments supporting warehouse management. He is almost very good at independently analyzing processes that improve the functioning of warehouses.
- › 5,0 Student knows very well the IT and economic instruments supporting warehouse management. He is able to independently analyze processes that improve the functioning of warehouses.

EU 3 Student characterizes the methods of planning the development of IT infrastructure in transport bases and warehouses.

- › 2,0 Student does not know the methods of planning the development of IT infrastructure in transport bases and warehouses.
- › 3,0 Student partially knows the methods of planning the development of IT infrastructure in transport bases and warehouses.
- › 3,5 Student can almost plan the development of IT infrastructure in transport bases and warehouses.
- › 4,0 Student is able to plan the development of IT infrastructure well in transport bases and warehouses.
- › 4,5 Student is almost very good at planning the development of IT infrastructure in transport bases and warehouses.
- › 5,0 Student is able to plan the development of IT infrastructure very well in transport bases and warehouses.

EU 4 Student has basic knowledge of the effectiveness of logistics processes in terms of processes.

- › 2,0 Student has no knowledge of the effectiveness of logistics processes in terms of processes.
- › 3,0 Student has a partial knowledge of the effectiveness of logistics processes in terms of processes.
- › 3,5 Student has almost knowledge of the effectiveness of logistic processes in terms of processes.
- › 4,0 Student has a good knowledge of the effectiveness of logistics processes in terms of processes.
- › 4,5 Student has almost a very good knowledge of the efficiency of logistics processes in terms of processes.
- › 5,0 Student has a very good knowledge of the effectiveness of logistics processes in terms of processes.

Polish course name	ETYKA INŻYNIERSKA
English course name	ENGINEERING ETHICS
Course code	WIP-MDL-D1-EE-07
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	7
Number of ECTS points	2
Ways of assessment	Test

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15	15			

TEACHERS:

Prof. dr hab. inż. Anna Kawalek,

Dr inż. Teresa Bajor,

Dr inż. Grzegorz Banaszek.

COURSE OBJECTIVES:

- › **C1** Provide students with knowledge of basic ethical standards and systems.
- › **C2** Instructing students to understand ethical principles, evaluate the ethical aspects of business functioning, and appropriate choices of behavior from the point of view of ethics.
- › **C3** Acquainting students with the role of ethical values in business activity.
- › **C4** Acquiring by students the skill of ethical evaluation of specific economic events.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Basic information on social and economic phenomena.
2. Ability to observe, self-reflection.
3. Ability to use literature sources and internet resources.
4. Ability to work independently and in a group.

5. Ability to correctly interpret and present your own actions.

COURSE CONTENT

LECTURE

- › **L1** General problems of ethics and morality.
- › **L2** Ethical foundations of business morality.
- › **L3** The ethical dimension of economic competition. Principles of fair competition.
- › **L4, L5** Conflicts of values in business. Moral evaluations and decisions.
- › **L6, L7** Enterprise - a moral entity. Ethics in business management.
- › **L8, L9** Personnel management ethics.
- › **L10, L11** International business ethics. Negotiations with foreign partners.
- › **L12, L13** Codes of ethics and professional standards, ethical reward and punishment.
- › **L14, L15** Intellectual property protection, industrial property law - inventions, patents, trademarks.

SEMINAR

- › **S1** Problems of ethics and morality in the modern world.
- › **S2** Business ethics - basic values.
- › **S3, S4** Examples of ethical problems in business.
- › **S5, S6** The importance of moral values in economic activity.
- › **S7, S8** The ethical dimension of management in the enterprise.
- › **S9, S10** Ethical aspects of human resource management.
- › **S11, S12** Business ethics in international contacts.
- › **S13** Engineer's code of professional ethics.
- › **S14, S15** Patents and copyright - what is the protection of intellectual property.

BASIC REFERENCES

1. Griffin R.W.: Podstawy zarządzania organizacjami, Wydawnictwo Naukowe PWN, Warszawa 2006 r.
2. Gałkin A., Kawalek A.: Zarządzanie i etyka stosunków biznesowych. Wyd. WIPMiFS, Częstochowa, 2004 r.
3. Gasparski W.: Biznes, etyka, odpowiedzialność. Wyd. PWN, Warszawa, 2021 r.

4. Schopenhauer A.: O podstawie moralności. Wyd. Vis-a-vis/Etiuda, Kraków, 2021 r.
5. Sanchez-Migallon S.: Etyka. Wyd. Jedność, Kielce, 2022 r.
6. Klimek J.: Etyka biznesu. Teoretyczne założenia, praktyka zastosowań. Wyd. Difin, Warszawa, 2014 r.
7. Buglewicz K.: Społeczna odpowiedzialność biznesu. Wyd. PWE, Warszawa, 2019 r.
8. Current laws, regulations and standards, concerning copyright and related rights.
9. Ossowska M.: Normy moralne Próba systematyzacji. Wyd. PWN, Warszawa, 4, 2022 r.
10. Fromm E.: O byciu człowiekiem. Wyd. Vis-a-vis/Etiuda, Kraków, 2019 r.

LEARNING OUTCOMES

- › **EU1** The student understands the importance of ethics and morality in business.
- › **EU2** The student is able to think in ethical terms when making decisions about creating and running a business.
- › **EU3** The student is able to independently analyze moral conflicts and evaluate contemporary moral problems.
- › **EU4** The student is able to take part in discussions, present his opinions and justify his opinion. Can work individually and in a team.

TEACHING TOOLS

- › Lecture with the use of audiovisual aids.
- › Teaching materials prepared by the instructor.
- › E-learning platform of the Częstochowa University of Technology, or other distance learning tools.

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

- › **F1.** Assessment of activity during classes.
- › **P1.** Assessment of the mastery of the teaching material being the subject of the lecture - final test.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures	15	0,6
Seminar	15	0,6
Classes		
Laboratory		
Project		
Test	2	0,08
Exam		
Total contact hours	32	1,28
Student's own work		
Getting acquainted with the indicated literature	5	0,2
Preparation for seminar	9	0,36
Preparation for classes		
Preparation for lab		
Project preparation		
Consultation	2	0,08
Preparation for the test	2	0,08
Total student's own work	18	0,72
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	Course objectives	Course content	Ways of assessment
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	outcomes defined for whole program			
EU 1	K_W01, K_W07, K_W08, K_U04, K_U07, K_K01, K_K03, K_K04,	C1÷C4	L1, S1	F1, P1
EU 2	K_W01, K_W06, K_W07, K_W08, K_U04, K_U07, K_K01, K_K02, K_K04,	C1÷C4	L2 ÷ L15, S2 ÷ S15	F1, P1
EU 3	K_W01, K_W06, K_W07, K_W08, K_U04, K_U07, K_K01, K_K02, K_K04,	C1÷C4	L2 ÷ L15, S2 ÷ S15	F1, P1
EU 4	K_W01, K_W06, K_W07, K_W08, K_U04, K_U07, K_K01, K_K02, K_K04,	C1÷C4	L3 - L15 S3 ÷ S15	F1, P1

FORM OF ASSESSMENT - DETAILS

EU1 The student understands the importance of ethics and morality in business.

- › 2,0 The student does not understand the importance of ethics and morals in business.
- › 3,0 The student is able to define the basic concepts of business ethics.
- › 3,5 The student knows some moral and ethical rules and norms in business.
- › 4,0 The student knows almost all moral and ethical rules and norms in business.
- › 4,5 The student knows the moral and ethical principles and norms in business.
- › 5,0 The student understands the importance of ethics and morality in business.

EU2 The student is able to think in ethical terms when making decisions about creating and running a business.

- › 2,0 The student is not able to think in ethical terms when making decisions about creating and running a business.
- › 3,0 The student has a basic knowledge of the role of ethics in creating and running a business.
- › 3,5 The student knows the role of ethics in creating and running a business.
- › 4,0 The student knows the ethical dimensions of the company's functioning.
- › 4,5 The student is able to properly build business relations, taking into account moral and ethical standards.
- › 5,0 The student is able to think in ethical terms when making decisions about creating and running a business.

EU 3 The student is able to independently analyze moral conflicts and evaluate contemporary moral problems.

- › 2,0 The student is not able to independently analyze moral conflicts and evaluate contemporary moral problems.
- › 3,0 The student has little ability to identify an ethical conflict in business.
- › 3,5 The student has the ability to highlight an ethical conflict in business.
- › 4,0 The student has the ability to identify an ethical conflict in business and is able to interpret some conflicts based on known theories.
- › 4,5 The student has the ability to identify an ethical conflict in business activities and interprets the conflict based on known theories.
- › 5,0 The student has the ability to interpret any moral conflict in business, is able to indicate possible solutions to the conflict based on the standards of business ethics.

EU 4 The student is able to take part in discussions, present his opinions and justify his opinion. Can work individually and in a team.

- › 2,0 The student is not able to take part in the discussion, present his opinions and justify his opinion. He cannot work individually and in a team.
- › 3,0 The student understands the advantages of working in a team, is able to take part in discussions.
- › 3,5 The student understands the advantages of working in a team, is able to take part in discussions and actively participates in classes.
- › 4,0 The student actively participates in teamwork, is able to take part in discussions, present his / her opinions.

- › 4,5 The student actively participates in team work, both as a member and as a team leader, is able to take part in discussions, present his / her opinions.
- › 5,0 The student actively participates in team work, both as a member and as a team leader, is able to take part in discussions, present his opinions and justify his opinion.

Polish course name	KREATYWNOŚĆ PRACOWNIKÓW I TWÓRCZE ZESPOŁY
English course name	CREATIVITY OF EMPLOYEES AND CREATIVE TEAMS
Course code	WIP-MDL-D1-COEAC-07
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	7
Number of ECTS points	2
Ways of assessment	Test

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
15	15			

TEACHERS:

Dr inż. Ewa Staniewska,

Dr inż. Monika Górka.

COURSE OBJECTIVES:

- › **C1** Provide students with knowledge in the field of creativity, the creative process as well as methods and techniques of creativity.
- › **C2** Students acquire practical skills in the field of analysis and solving practical problems.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

1. Basic general knowledge.
2. Ability to work independently and in a group.
3. Ability to use literature sources and internet resources.

COURSE CONTENT

LECTURE

- › **L1 - L 3** Basic concepts of creativity. Creative processes. Kinds of creativity: explorations - combinations - transformations. Factors favoring creativity and limitations of the creative process.
- › **L 4** Creative communication, persuasive communication, communication in a group.
- › **L 5 - L 10** Methods of creative thinking. Rules for creating creative sessions. Tools for examining creative predispositions. Self-assessment questionnaire and psychometric analysis. Questionnaire of the creative attitude of employees.
- › **L 11 - L 14** Organizational culture and creativity. - Creativity in the workplace. Building creative teams.
- › **L 15** Completion of the course.

SEMINARY

- › **S1** Introduction to classes and scope.
- › **S2** The role of productive and critical thinking in creativity.
- › **S3** Associations as a source of creative thinking.
- › **S4 - S7** Analytical and heuristic techniques.
- › **S8** The design thinking process.
- › **S9** The process of assessing creativity.
- › **S10** Methods and techniques for stimulating creativity.
- › **S11** Organizational creativity and innovation.
- › **S12** Model of creative organization.
- › **S13** Management and creative teams.
- › **S14,15** Presentations and passing the course.

BASIC REFERENCES

1. H. Bieniok, G. Gruszczyńska –Malec, G. Królik: Techniki Kreatywnego myślenia, Wyd. UE w Katowicach, Katowice 2013 r.
2. M. Brzeziński: Organizacja kreatywna, PWN, Warszawa 2009 r.
3. T. Hurson: Genialiny umysł. Jak myśleć i działać kreatywnie, Helion, Gliwice 2010 r.

SUPPLEMENTARY REFERENCE MATERIALS

1. E. Nęcka i współautorzy, Trening twórczości, Smak Słowa, Sopot 2019 r.

2. Wojtczuk-Turek A., Rozwijanie kompetencji twórczych, Of. Wyd. SGH,
Warszawa 2008 r.

LEARNING OUTCOMES

- › **EU1** The student has knowledge of creativity and the creative process, and knows the basic methods and techniques of creativity.
- › **EU2** The student is able to apply selected methods to solve practical problems.

TEACHING TOOLS

- › Multimedia presentations.
- › CUT e-learning platform (possible use).

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

- › **F1.** Assessment of the implementation of tasks included in the curriculum and presentation.
- › **P1.** Assessment of the mastery of the teaching material within the lectures - final test.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures	15	0,6
Seminar	15	0,6
Classes		
Laboratory		
Project		
Test	3	0,12
Exam		
Total contact hours	33	1,32
Student's own work		
Getting acquainted with the indicated literature	5	0,2
Preparation for seminar	5	0,2
Preparation for classes		
Preparation for lab		

Project preparation		
Consultation	2	0,08
Preparation for the test	5	0,2
Total student's own work	17	1,68
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_W07, K_U02, K_K01, K_K02, K_K03,	C1	L1 - L15	P1
EU 2	K_W07, K_U04, K_K01, K_K02, K_K03,	C2	S1 - S15	F1

FORM OF ASSESSMENT - DETAILS

EU1 The student has knowledge of creativity and the creative process, and knows the basic methods and techniques of creativity.

- › 2,0 The student does not have basic knowledge of creativity and the creative process as well as basic methods and techniques of creativity.
- › 3,0 The student has basic knowledge of creativity and the creative process and knows the basic methods and techniques of creativity.

- › 3,5 The student has mastered the basic knowledge of creativity and the creative process and knows the basic methods and techniques of creativity sufficiently plus.
- › 4,0 The student has knowledge of creativity and the creative process, and knows the basic methods and techniques of creativity.
- › 4,5 The student has mastered the basic knowledge of creativity and the creative process and knows the basic methods and techniques of creativity to a good plus degree.
- › 5,0 The student has a significant knowledge of creativity and the creative process, and knows the basic methods and techniques of creativity.

EU2 The student is able to apply selected methods to solve practical problems,

- › 2,0 The student is not able to apply selected methods to solve practical problems,
- › 3,0 The student is able to partially apply selected methods to solve practical problems,
- › 3,5 The student is able to sufficiently plus apply selected methods to solve practical problems,
- › 4,0 The student is able to apply selected methods to solve practical problems,
- › 4,5 The student is able to apply selected methods to solve practical problems to a good plus degree,
- › 5,0 The student is able to very well apply selected methods to solve practical problems,