Zał. Nr 1 do ZW 78/2023

PROGRAM OF STUDIES

FACULTY: Faculty of Management
MAIN FIELD OF STUDY: Business Engineering
BRANCH OF SCIENCE: Social sciences / Engineering and Technology
DISCIPLINES: D1 Management and quality studies (major discipline)
D2 Computer Engineering and Telecommunications
EDUCATION LEVEL: second-level studies
FORM OF STUDIES: full-time studies
PROFILE: general academic
LANGUAGE OF STUDY:

1. Project management (ZPR) - polish
2. Business Intelligence (BI) - english

Content:

Resolution no. … of the Senate of Wroclaw University of Science and Technology

In effect since 2023/2024

Zał. Nr 2 do ZW 78/2023
Attachment no. 1. to the Program of Studies

ASSUMED LEARNING OUTCOMES

FACULTY: Faculty of Management
MAIN FIELD OF STUDY: Business Engineering
EDUCATION LEVEL: second-level studies
PROFILE: general academic

Location of the main-field-of study:

Branch of science: Social sciences/ Engineering and Technology
Discipline / disciplines (for several disciplines, please indicate the major discipline)

D1: Management and quality studies (major discipline)
D2: Computer Engineering and Telecommunications

Explanation of the markings:
P7U – universal first degree characteristics corresponding to education at the second-level studies - 7 PRK level

P7S – second degree characteristics corresponding to education at the second-level studies - 7 PRK level

W - category "knowledge"
U - category "skills"
K - category "social competences"
K (*faculty symbol*) _W1, K (*faculty symbol*) _W2, K (*faculty symbol*) _W3, … - main-field-of study learning outcomes related to the category "knowledge"
K (*faculty symbol*) _U1, K (*faculty symbol*) _U2, K (*faculty symbol*) _U3, … - main-field-of study learning outcomes related to the category "skills"
K (*faculty symbol*) _K1, K (*faculty symbol*) _K2, K (*faculty symbol*) _K3, … - main-field-of study learning outcomes related to the category "social competences"
… _inż. – learning outcomes related to the engineer competences

Main field of study learning outcomes	Description of learning outcomes for the main-field-of study **BUSINESS ENGINEERING** After completion of studies, the graduate:	Reference to PRK characteristics		
		Universal first degree characteristics (U)	Second degree characteristics typical for qualifications obtained in higher education (S)	
			Characteristics for qualifications on 7 levels of PRK	Characteristics for qualifications on 6 and 7 levels of PRK, enabling acquiring engineering competences
KNOWLEDGE (W)				
K2_IZ_W1	Knows and understands advanced IT models, methods and tools, especially simulation tools, used to solve management decision-making problems.	P7U_W	P7S_WG P7S_WK	
K2_IZ_W2	Knows and understands the methods and IT tools of data preparation, coming from various sources, necessary to make business decisions.	P7U_W	P7S_WG P7S_WK	
K2_IZ_W3	Knows and understands technologies, the most important functions and applications of IT solutions supporting business.	P7U_W	P7S_WG P7S_WK	
K2_IZ_W4	Knows and understands to a greater extent theoretical methods (mathematical, econometric, statistical, forecasting) used to support decision-making processes, including explaining the complex relationships between the phenomena occurring in these processes in the area of management.	P7U_W	P7S_WG	P7S_WG_inż
K2_IZ_W5	Knows professional IT packages for modeling and statistical and econometric analyzes supporting the solution of decision problems in management processes.	P7U_W	P7S_WG	P7S_WG_inż
K2_IZ_W6	Identifies inter-organizational relations and interactions of the organization with the environment in the context of national, international and intercultural conditions. Explains and illustrates the impact of the environment on the activities of the organization.	P7U_W	P7S_WK	
K2_IZ_W7	Has extended and in-depth substantive knowledge of the organization and functioning of the enterprise in the field of strategic management, logistics, marketing, finance, and business architecture.	P7U_W	P7S_WG P7S_WK	
K2_IZ_W8	Has in-depth knowledge of technical means and IT systems of communication in organizations (including the processes taking place in their life cycle) and knows the features of an efficient communication process.	P7U_W	P7S_WG	P7S_WG_inż

K2_IZ_W9	Has in-depth knowledge of the methods and techniques of diagnosing and improving activities in individual functional areas of the organization and selected methods of researching the environment of the enterprise. He knows the norms and standards in individual functional areas.	P7U_W	P7S_WG	P7S_WG_inż
K2_IZ_W10	He knows and understands the in-depth understanding of the essence of risk, its sources and the need to limit it in the functioning of enterprises. He knows the principles of risk management and the methods of its measurement and methods of its estimation and reduction.	P7U_W	P7S_WG	
K2_IZ_W11	Knows and understands the interactions occurring in selected physical systems between their individual elements and people (employees) functioning within them.	P7U_W	P7S_WK	P7S_WG_inż
K2_IZ_W12	Knows and understands the social decision-making and leadership mechanisms in an organization.	P7U_W	P7S_WG	
K2_IZ_W13	Knows and understands the norms and standards (economic, legal, organizational and ethical) that determine the context of the economy and organization.	P7U_W	P7S_WK	
K2_IZ_W14	Knows and understands the concepts, theories, methods and instruments in the field of economic and legal policy used to regulate the economy.	P7U_W	P7S_WG	
K2_IZ_W15	Knows and deeply understands the process of project management and project portfolio at all stages of its implementation, in particular, he knows the advanced level of agile methodologies as well as mathematical and IT tools.	P7U_W	P7S_WG	P7S_WG_inż P7S_WK_inż
K2_IZ_W16	Has an extended and in-depth knowledge of the principles of building and functioning teams and the factors influencing their efficiency	P7U_W	P7S_WG	
SKILLS (U)				
K2_IZ_U1	Can choose methods and IT tools, especially simulation ones, to build models of management decision problems, and perform experiments to assess the effects of decision variants.	P7U_U	P7S_UW	P7S_UW_inż
K2_IZ_U2	Using IT tools, student can search, combine, organize and present data for the purposes of making business decisions.	P7U_U	P7S_UW	P7S_UW_inż
K2_IZ_U3	Using IT tools student can analyze the requirements of available technologies and plan the use of IT solutions supporting business.	P7U_U	P7S_UW	P7S_UW_inż
K2_IZ_U4	By participating in business decision-making processes, is able to plan and carry out experiments and - by making	P7U_U	P7S_UW	P7S_UW_inż

	measurements and computer simulations - to interpret the obtained results and draw conclusions.			
K2_IZ_U5	Can use analytical, simulation and experimental methods to identify and formulate specifications of engineering tasks and to solve them.	P7U_U	P7S_UW	P7S_UW_inż
K2_IZ_U6	Can make a critical analysis of the functioning of the existing IT tools for management and evaluate these solutions and - in accordance with the given specification - design and implement simple IT tools typical for management, using appropriately selected appropriate methods, techniques, technologies and tools.	P7U_U	P7S_UW	P7S_UW_inż
K2_IZ_U7	Can use knowledge in the selection of sources and information necessary to build complex models of decision-making processes and make a critical and synthetic analysis of this information.	P7U_U	P7S_UW	P7S_UW_inż
K2_IZ_U8	Can use knowledge to formulate and test hypotheses verifying the usefulness of methods and models to support decision-making processes in the area of management.	P7U_U	P7S_UW	P7S_UW_inż
K2_IZ_U9	Can use knowledge in the field of knowledge of professional IT packages for modeling and statistical analyzes for the purpose of solving decision problems in the area of management.	P7U_U	P7S_UW	P7S_UW_inż
K2_IZ_U10	Can use specialized language to communicate in the professional environment in the field of specific issues in the area of management and quality sciences - in Polish and a foreign language (1).	P7U_U	P7S_UK	
K2_IZ_U11	Understands Polish and foreign (1) texts in the field of management, can interpret them, draw conclusions, obtain necessary information, interpret and critically evaluate them, read professional literature, business and organizational documentation with understanding.	P7U_U	P7S_UK	
K2_IZ_U12	Speaks a foreign language (2) sufficiently understandable for a native speaker of the language and uses basic linguistic measures relating to the specific needs of everyday life, both in written and spoken form.	P7U_U	P7S_UK	
K2_IZ_U13	Uses basic skills in a foreign language (2): understands simple spoken and read texts, can establish social contacts, expresses coherently on a known topic, can write an e-mail, card or note.	P7U_U	P7S_UK	
K2_IZ_U14	Distinguishes and uses to a limited extent the official and unofficial variety of a foreign language (2) and uses basic	P7U_U	P7S_UK	

	sociocultural knowledge in communication in a given foreign language (2).			
K2_IZ_U15	Has the ability to analyze the causes and dynamics of phenomena in the organization's environment in the conditions of a market economy and the applicable economic and legal regulations.	P7U_U	P7S_UW P7S_UK	
K2_IZ_U16	Is able to analyze and evaluate goals, features, elements, processes, functional areas in the enterprise as well as internal and inter-organizational relations, using concepts and theoretical approaches in the field of social sciences, in particular the discipline of management and quality science.	P7U_U	P7S_UW P7S_UK	
K2_IZ_U17	Is able, using appropriate methods and tools, to design: systems and processes in the area of logistics, enterprise strategy, business architecture, communication management and projects implemented in the form of projects.	P7U_U	P7S_UW P7S_UK	P7S_UW_inż
K2_IZ_U18	Can formulate innovative alternative solutions to management and substantive problems in the enterprise. Can justify, make a choice and verify them in accordance with the established priorities. Can plan actions to solve them.	P7U_U	P7S_UW P7S_UK	P7S_UW_inż
K2_IZ_U19	Can identify risk factors and assess their impact on the course and results of the process and propose preventive actions.	P7U_U	P7S_UW P7S_UK	P7S_UW_inż
K2_IZ_U20	Can plan the course of measurements and evaluation of the parameters of selected physical systems, also taking into account the human factor.	P7U_U	P7S_UW	P7S_UW_inż
K2_IZ_U21	Can describe selected issues encountered in everyday and professional life using mathematical and physical formalism and draw conclusions.	P7U_U	P7S_UW	P7S_UW_inż
K2_IZ_U22	Can solve problems in communicating with diverse groups of recipients in team forms of work organization.	P7U_U	P7S_UK	
K2_IZ_U23	Can identify behavioral factors and methods influencing team work management, decision making and assuming the role of a leader in the organization.	P7U_U	P7S_UO P7S_UU	
K2_IZ_U24	Can use his knowledge to analyze economic phenomena and solve economic problems as well as adapt, justify and apply appropriate norms and standards (economic, legal, social) in specific activities in the organization.	P7U_U	P7S_UW	
K2_IZ_U25	Can use his knowledge to identify the potential effects of the introduced economic and legal regulations for enterprises.	P7U_U	P7S_UW	
K2_IZ_U26	Has developed research skills: formulates simple hypotheses and research problems, selects adequate methods, techniques	P7U_U	P7S_UW	P7S_UW_inż

	and research tools, develops, presents and interprets research results, draws conclusions, indicates directions for further research in the field of management and quality sciences, technical information technology and telecommunications.		P7S_UU	
K2_IZ_U27	Is able to identify - at an advanced level, complex and unusual management and substantive problems in projects implemented in the form of a project.	P7U_U	P7S_UW P7S_UK	P7S_UW_inż
SOCIAL COMPETENCES (K)				
K2_IZ_K1	Is ready to take actions to comply with the principles of professional ethics.	P7U_K	P7S_KR	
K2_IZ_K2	Can cooperate and work in group and team forms of work organization (assuming different roles in them).	P7U_K	P7S_KR P7S_KO	
K2_IZ_K3	is ready to flexibly search for and select methods and tools for solving problems arising in the workplace.	P7U_K	P7S_KK	
K2_IZ_K4	Is ready to lead and take responsibility for the group, organize and manage his own and others' work, taking into account the changing individual, team and organizational needs.	P7U_K	P7S_KR P7S_KO	
K2_IZ_K5	Is ready to critically assess and resolve problems (recognizing the importance of expert knowledge and opinions) regarding decision-making and leadership in the group and organization, including meeting social obligations and initiating activities for the public interest and the social environment.	P7U_K	P7S_KK P7S_KO	
K2_IZ_K6	Is aware of the need for an independent, critical assessment of the scope and level of his knowledge and professional skills, both in the field of management and quality sciences, technical informatics and telecommunications, as well as in the interdisciplinary dimension. Is prepared to independently search for areas of knowledge to supplement and skills to improve.	P7U_K	P7S_KK P7S_KO P7S_KR	
K2_IZ_K7	Is prepared to behave in a professional and ethical manner; perceives and formulates ethical dilemmas related to his own and someone else's work; seeks appropriate solutions and the possibility of correcting irregularities in their attitudes and behavior in the workplace.	P7U_K	P7S_KK P7S_KO P7S_KR	

PROJECT MANAGEMENT

Zał. nr 3 do ZW 16/2020
Attachment no. 2. to the Program of Studies

DESCRIPTION OF THE PROGRAM OF STUDIES

Main field of study: Business Engineering **Profile: general academic**

Level of studies: second-level studies **Form of studies: full-time studies**

1. General description

*1.1 Number of semesters:***3**	*1.2 Total number of ECTS points necessary to complete studies at a given level:****90***
*1.3 Total number of hours:***987**	*1.4 Prerequisites (particularly for second-level studies):* **Graduate at least of first-level studies (bachelor of engineering).** **According to the resolution No. 37/3/2020-2024 of PWr Senate. from 19 November 2020**
*1.5 Upon completion of studies graduate obtains professional degree of: **Master of Science***	*1.6 Graduate profile, employability:* **Description** Responding to the needs of the market, the studies combine managerial competences with the improvement of IT skills. In both specializations, students will improve their skills in analyzing data from the market environment of enterprises, predictive analysis, algorithmic business thinking, cloud services for business, business psychology, digital marketing as well as project and business management. The best students will be able to conduct research with

	our scientists with the prospect of working in an academic environment. At the second degree of Business Engineering (BE), students can deepen their acquired knowledge and extend it by choosing one of two specializations: English-language specialization (Business Intelligence, BI) focused on aspects related to business analytics or Polish-language specialization (Project Management, ZPR) oriented on the management of various types of projects (business, IT, social, public, scientific, etc.). Project Management (ZPR) is designed to provide students with skills and knowledge in advanced management of ventures of various types (business, IT, social, public, scientific, etc.). The 3-semester studies offer blocks of classes in the following areas: project management, business analytics, business management and improvement of managerial competence. The knowledge gained will allow graduates to work not only as a project manager or project team leader, but also as a data analyst or consultant in business, public sector, NGOs and research units. Completion of this specialty will also make it easier to set up and run your own business. **Acquired skills and competences** Students will learn how to: ● Apply advanced project management methods and tools. ● Use data to make informed business decisions and thrive in a rapidly changing environment.

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[2]Traditional – enter T, remote – enter Z
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[4]University-wide subject /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
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	● Use advanced tools to explore and analyze data extracted from the environment in which the company operates. ● Apply advanced forecasting and simulation methods and computational statistics. ● Reach the right customers with the right products and effective communications.
1.7 Possibility of continuing studies: **doctoral school, postgraduate (post diploma) studies**	*1.8 Indicate connection with University's mission and its development strategy:* Business engineering graduates acquire business, analytical, social and technical competences. The educational program in Business engineering is coherent with the mission of Wrocław University of Science and Technology in the following areas: ● Developing the professionalism and hard skills of graduates in business data analysis and project management that determine the functioning of the TechnoSphere ● Aiming to provide high quality classes and providing the students of Business engineering and lecturers with conditions enabling open discussion and constructive criticism; ● Developing the values and tradition of higher education, wide-ranging cooperation with other universities all over the world via students taking part in scientific conferences and the Erasmus program, and with employers via practical learning, carried out in the form of projects in specific organizations; ● Developing creative, critical and tolerant graduates, as studying a subject in Business engineering emphasizes on appropriate skills and attitudes development;

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	• Striving to obtain a worthy place in the field of training specialists in the field of management among domestic and foreign universities. The Faculty's development plan is in line with the University's strategy. In particular, the Faculty "... combines theoretical, research and expert competences with didactic and educational competences. The Faculty is a leading research and teaching center in Poland and a significant center on an international scale. The didactic and scientific-research profile as well as the quality of education and research in economic and technical sciences ensure it a suitable place in national and international rankings". Conducting Business engineering studies is a permanent element of the Faculty's development strategy. In line with the principle adopted at Wrocław University of Science and Technology, studies in the field of Business engineering have a general academic profile. The study curriculum meets all the requirements resulting from applicable law, including the Polish Qualifications Framework and the characteristics of obtaining engineering competences. In line with the University's strategy, in order to increase the attractiveness of studies on the educational market, the MSc studies education program is unique in that it uses the natural - in economic practice - complementarity of technical and economic education, enriched with an IT module. In accordance with the University's strategy and the Faculty's development plan, which indicate the need for links with the region and the economy, conditions are created and systematic contacts between students and enterprises and other institutions are forced in the didactic process. In line with the University's development strategy, the quality of education is systematically improved. This is achieved thanks to the

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	scientific development of employees and the increase in their teaching competences, as well as thanks to the systematic enrichment of the Faculty's infrastructure, including the modernization of the rooms as well as teaching and laboratory aids. At the second degree of studies in the field of Business engineering, the study curriculum includes a set of learning outcomes and the corresponding substantive content of education, enabling graduates to effectively compete on the labor market. Students are prepared to continue their third-cycle studies at the Doctoral School and to conduct their own research. Graduates are also aware of the need to constantly act for their own professional development in cooperation with their home university.

2. Detailed description

2.1 Total number of learning outcomes in the program of study: W (knowledge) = 16, U (skills) = 27, K (competences) = 7, W + U + K = 50

2.2 For the main field of study assigned to more than one discipline - the number of learning outcomes assigned to the discipline:

D1 Management and quality science (major): 36 (this number must be greater than half the total number of learning outcomes)
D2 Information and Technology Science: 14

2.3 For the main field of study assigned to more than one discipline - percentage share of the number of ECTS points for each discipline:

D1 73% ECTS points
D2 27% ECTS points

2.4a. For the general academic profile of the main field of study – the number of ECTS points assigned to the classes related to the University's academic activity in the discipline or disciplines to which the main field of study is assigned – DN (must be greater than 50% of the total number of ECTS points from 1.2) 87

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2.4b. For the practical profile of the main field of study - the number of ECTS points assigned to the classes shaping practical skills (must be greater than 50% of the total number of ECTS points from 1.2)

2.5 Concise analysis of compliance of the assumed learning outcomes with the needs of the labor market

The assumed learning outcomes correspond to the requirements set by employers for employees/ graduates on the labor market, in particular in the field of:

- identifying, at the level of the whole organization, the real needs of individual business domains, in connection with the overall strategy of the organization,
- managing projects, building programs, project portfolios in line with the organization's objectives,
- solving decision-making problems with advanced data analysis, optimization and simulation methods using professional IT tools,
- identifying and analyzing the needs of users of IT systems, directing the implementation of these systems and studying their usability.
- identifying and delivering the value expected by customers through relationship management focused on achieving the organization's goals.

The learning outcomes meet the demand for specialists/managers prepared to create and implement business strategies using a system and project approach and IT tools, able to integrate knowledge and engineering skills in management and quality sciences in relation to solving complex substantive and managerial problems. The competencies obtained in the subject of training will enable the graduate to effectively carry out tasks in specific areas of the organization's activities, in particular:

- management of business processes and business domains,
- project, program, project portfolio management,
- change management,
- management in an e-economy environment

The program of studies in the field of Business Engineering at the second-cycle studies and many years of experience of the teaching staff create conditions for the graduates to achieve the assumed learning outcomes and meet the above requirements formulated by employers.

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2.6. The total number of ECTS points that a student must obtain in classes requiring direct participation of academic teachers or other persons conducting classes and students (enter the sum of ECTS points for classes / groups of classes marked with the BU[1] code) **45,84 ECTS**

2.7. Total number of ECTS points, which student has to obtain from basic sciences classes

Number of ECTS points for obligatory classes	5
Number of ECTS points for optional classes	2
Total number of ECTS points	7

2.8. Total number of ECTS points, which student has to obtain from practical classes, including project and laboratory classes (enter total number of ECTS points for classes/group of classes denoted with code P)

Number of ECTS points for obligatory classes	31
Number of ECTS points for optional classes	33
Total number of ECTS points	64

2.9. Minimum number of ECTS points, which student has to obtain doing education blocks offered as part of University-wide classes or other main field of study (enter number of ECTS points for classes/groups of classes denoted with code O)

3 ECTS points

2.10. Total number of ECTS points, which student may obtain doing optional blocks (min. 30% of total number of ECTS points)

41 ECTS points

3. Description of the process leading to learning outcomes acquisition:

The process leading to the achievement of the planned learning outcomes is multi-stage, in accordance with the current Academic Regulations, the Program of Studies and the Educational Quality Assurance System, and consists of the following elements:

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1. Participation in classes organized at the university – as part of the educational process, acquiring knowledge and skills during lectures, workshops, laboratories, projects and seminars. Classes are carried out individually or in teams, and are conducted in such a way as to allow discussion, presentation of the results of one's own work and learning to solve problems, including those of a research nature, as well as independent thinking and drawing conclusions.
2. Using the university's educational support platform "ePortal" – reading materials published by the teacher and open resources, solving tasks and tests.
3. Group work – within some subjects the student participates in group tasks. He or she then takes part in organizing of the group's work, evaluating the activities of individual participants and takes responsibility for the outcome of the group's work.
4. Self-work – the student completes assigned work in class and at home, and prepares for classes, tests and exams by studying the literature and materials recommended by the teacher.
5. Diploma thesis – the student conducts comprehensive research, analysis and expertise, and then develops a diagnosis and/or design of a solution to solve a managerial problem.
6. Consultations – the student has the opportunity to take advantage of an additional, optional form of education that supports the achievement of learning outcomes, by participating in the office hours of teachers, in order to clarify their doubts and verify the correct understanding of the content of the classes.
7. Verification of knowledge and skills (ongoing and at the end of the semester) – the student, while completing the courses assigned to the program of study, also confirms the achievement of learning outcomes in terms of acquired knowledge, skills and social competencies assigned to the subject.
8. Diploma exam – the student prepares for the final exam by reviewing the material from the entire study. During the exam, the achievement of learning outcomes is verified.
9. Other activities engaging, retraining and expanding knowledge and skills – students have the opportunity to:
– participate in site visits, job fairs, meetings with managers, competitions, etc. (eg. AMA, Praktyczna Strona Biznesu, Your future in Tech, Project Master, IPMA-Student, ABi Akademia Biznesu etc.),
– participate in international student exchanges, and through contact with foreigners studying at the Faculty gain additional interpersonal, cultural and language skills,
– participate in research projects conducted at the Faculty, attend conferences and scientific seminars,
– get involved in the activities of scientific associations and student organizations, thereby gaining valuable interpersonal skills and social competences.

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4. List of education blocks:

4.1. List of obligatory blocks:

4.1.1 List of general education blocks

4.1.1.1 *Liberal-managerial classes* block *(min. 2 ECTS points):*

No.	Subject/ group of classes code	Name of subject/group of classes (denote group of classes with symbol **GK**)	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form[2] of subject/group of classes	Way[3] of crediting	Subject/group of classes			
			lec	cl	lab	pr	sem		ZZU	CNPS	Total	DN[5] classes	BU[1] classes			University-wide[4]	Concerning scientific activities[5]	Practical[6]	Type[7]
1.	W08IZZ-SM0004W	Business psychology	1					K2_IZ_W12,16U10,11,22,23K2_IZ_K1-5,7	15	25	1	1	0,68	T/Z	Z		DN		KO
2.	W08IZZ-SM0004S	Business psychology					1	K2_IZ_W12,16U10,11,22,23K2_IZ_K1-5,7	15	25	1	1	0,68	T	Z		DN	P	KO
		Total	**1**	**0**	**0**	**0**	**1**		**30**	**50**	**2**	**2**	**1,36**						

4.1.1.2 *Foreign languages* block *(min. ..... ECTS points):*

No.	Subject/ group of classes code	Name of subject/group of classes (denote group of classes with symbol **GK**)	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form[2] of subject/group of classes	Way[3] of crediting	Subject/group of classes			
			lec	cl	lab	pr	sem		ZZU	CNPS	Total	DN[5] classes	BU[1] classes			University-wide[4]	Concerning scientific activities[5]	Practical[6]	Type[7]
		Total																	

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final subject form (lec, cl, lab, pr, sem)
[4]University-wide subject /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

4.1.1.3 *Sporting classes* block *(0 ECTS points):*

No.	Subject/ group of classes code	Name of subject/group of classes (denote group of classes with symbol **GK**)	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form[2] of subject/group of classes	Way[3] of crediting	Subject/group of classes			
			lec	cl	lab	pr	sem		ZZU	CNPS	Total	DN[5] classes	BU[1] classes			University-wide[4]	Concerning scientific activities[5]	Practical[6]	Type[7]
		Total																	

4.1.1.4 *Information technologies* block *(min. .... ECTS points):*

No.	Subject/ group of classes code	Name of subject/group of classes (denote group of classes with symbol **GK**)	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form[2] of subject/group of classes	Way[3] of crediting	Subject/group of classes			
			lec	cl	lab	pr	sem		ZZU	CNPS	Total	DN[5] classes	BU[1] classes			University-wide[4]	Concerning scientific activities[5]	Practical[6]	Type[7]
		Total																	

Altogether for general education blocks

Total number of hours					Total number of ZZU hours	Total number of CNPS hours	Total number of ECTS points	Total number of ECTS points for DN classes[5]	Number of ECTS points for BU classes[1]
lec	cl	lab	pr	sem					
1	**0**	**0**	**0**	**1**	**30**	**50**	**2**	**2**	**1,36**

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final subject form (lec, cl, lab, pr, sem)
[4]University-wide subject /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

4.1.2 List of basic sciences blocks

4.1.2.1 *Mathematics* block

No.	Subject/ group of classes code	Name of subject/group of classes (denote group of classes with symbol **GK**)	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form[2] of subject/group of classes	Way[3] of crediting	Subject/group of classes			
			lec	cl	lab	pr	sem		ZZU	CNPS	Total	DN[5] classes	BU[1] classes			University-wide[4]	Concerning scientific activities[5]	Practical[6]	Type[7]
1.	W08IZZ-SM0010W	Econometric modelling and forecasting	2					K2_IZ_W4,5U1,5, 8-11,K1	30	50	2	2	1,28	T/Z	Z		DN		PD
2.	W08IZZ-SM0010L	Econometric modelling and forecasting			2			K2_IZ_W4,5U1,5, 8-11,K1	30	75	3	3	1,28	T	Z		DN	P	PD
		Total	**2**	**0**	**2**	**0**	**0**		**60**	**125**	**5**	**5**	**2,56**						

4.1.2.2 *Physics* block

No.	Subject/ group of classes code	Name of subject/group of classes (denote group of classes with symbol **GK**)	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form[2] of subject/group of classes	Way[3] of crediting	Subject/group of classes			
			lec	cl	lab	pr	sem		ZZU	CNPS	Total	DN[5] classes	BU[1] classes			University-wide[4]	Concerning scientific activities[5]	Practical[6]	Type[7]
		Total																	

4.1.2.3 *Chemistry* block

No.	Subject/ group of classes code	Name of subject/group of classes (denote group of classes with symbol **GK**)	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form[2] of subject/group of classes	Way[3] of crediting	Subject/group of classes			
			lec	cl	lab	pr	sem		ZZU	CNPS	Total	DN[5] classes	BU[1] classes			University-wide[4]	Concerning scientific activities[5]	Practical[6]	Type[7]
		Total																	

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final subject form (lec, cl, lab, pr, sem)
[4]University-wide subject /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

Altogether for basic sciences blocks:

Total number of hours					Total number of ZZU hours	Total number of CNPS hours	Total number of ECTS points	Total number of ECTS points for DN classes[5]	Number of ECTS points for BU classes[1]
lec	cl	lab	pr	sem					
2	**0**	**2**	**0**	**0**	**60**	**125**	**5**	**5**	**2,56**

4.1.3 List of the main field of study blocks

4.1.3.1 *Obligatory main field of study* blocks

No.	Subject/ group of classes code	Name of subject/group of classes (denote group of classes with symbol **GK**)	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form[2] of subject/group of classes	Way[3] of crediting	Subject/group of classes			
			lec	cl	lab	pr	sem		ZZU	CNPS	Total	DN[5] classes	BU[1] classes			University-wide[4]	Concerning scientific activities[5]	Practical[6]	Type[7]
1.	W08IZZ-SM0003G	Programming in the data analysis **GK**	1		2			K2_IZ_W2,3, U2,9-11, K1	45	75	3	3	1,96	w:T/Zl:T	Z		DN	P (2)	K
2.	W08IZZ-SM0005G	Business simulation **GK**	1		2			K2_IZ_W1, U1,4,5,10,11, K1	45	100	4	4	1,96	w:T/Zl:T	Z		DN	P (3)	K
3.	W08IZZ-SM0007G	Cloud computing services **GK**			1		1	K2_IZ_W3 U3,6,10,11,K1	30	100	4	4	1,36	T	Z		DN	P (4)	K
4.	W08IZZ-SM0002W	Methods of e-business support	1					K2_IZ_W3, U2,3,10,11, K1	15	25	1	1	0,68	T/Z	Z		DN		K
5.	W08IZZ-SM0002P	Methods of e-business support				1		K2_IZ_W3, U2,3,10,11, K1	15	50	2	2	0,68	T	Z		DN	P	K
6.	W08IZZ-SM0001W	Value and financial decisions engineering	2					K2_IZ_W7,10 U7,10,11,15,16,18,19,24,25, K1	30	100	4	4	1,36	T/Z	E		DN		K
7.	W08IZZ-SM0001C	Value and financial decisions engineering		2				K2_IZ_W7,10 U7,10,11,15,16,18,19,24,25, K1	30	50	2	2	1,28	T	Z		DN	P	K
8.	W08IZZ-SM0006S	Creative design					2	K2_IZ_W9, U10,11,16,18,19,22,23, K1-3,5-7	30	50	2	2	1,28	T	Z		DN	P	K

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final subject form (lec, cl, lab, pr, sem)
[4]University-wide subject /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

9.	W08IZZ-SM0011G	Web scraping and data analysis **GK**	1		1			K2_IZ_W2 U2,6,7,10,11 K2_IZ_K1,6	30	75	3	3	1,36	w:T/Z l:T	Z		DN	P (2)	K
10.	W08IZZ-SM0014W	Business management 1. Strategy and business model of the enterprise	1					K2_IZ_W6,7,9,14,U7,10,11 ,15-19,24,25,K1	15	50	2	2	0,76	T/Z	E		DN		K
11.	W08IZZ-SM0014P	Business management 1. Strategy and business model of the enterprise				2		K2_IZ_W6,7,9,14,U7,10,11 ,15-19,24,25,K1	30	50	2	2	1,28	T	Z		DN	P	K
12.	W08IZZ-SM0015W	Business management 2: Financing the development of business	1					K2_IZ_W6,7,9,13,14, U7,10,11,15-19,24,25,K1	15	50	2	2	0,68	T/Z	Z		DN		K
13.	W08IZZ-SM0015P	Business management 2: Financing the development of business				3		K2_IZ_W6,7,9,13,14, U7,10,11,15-19,24,25,K1	45	75	3	3	1,88	T	Z		DN	P	K
14.	W08IZZ-SM0066G	Integrated management information systems **GK**	1		1			K2_IZ_W2,3 U3,10,11, K1,6	30	50	2	2	1,36	w:T/Z l:T	Z		DN	P (1)	K
15.	W08IZZ-SM0019W	Business management III: Contemporary marketing	1					K2_IZ_W6,7,9,14,U7,10,11 ,15-19,24,25,K1	15	50	1	1	0,68	T/Z	Z		DN		K
16.	W08IZZ-SM0019P	Business management III: Contemporary marketing				2		K2_IZ_W6,7,9,14,U7,10,11 ,15-19,24,25,K1	30	50	2	2	1,28	T	Z		DN	P	K
17.	W08IZZ-SM0019S	Business management III: Contemporary marketing					1	K2_IZ_W6,7,9,14,U7,10,11 ,15-19,24,25,K1	15	25	1	1	0,68	T	Z		DN	P	K
18.	W08IZZ-SM0017S	Research workshop					1	K2_IZ_U8,10,11,26, K1,5,6	15	25	1	1	0,68	T	Z		DN	P	K
		Total	**10**	**2**	**7**	**8**	**5**		**480**	**1050**	**42**	**42**	**21,20**						

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final subject form (lec, cl, lab, pr, sem)
[4]University-wide subject /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

Altogether (for main field of study blocks):

Total number of hours					Total number of ZZU hours	Total number of CNPS hours	Total number of ECTS points	Total number of ECTS points for DN classes[5]	Number of ECTS points for BU classes[1]
lec	cl	lab	pr	sem					
10	**2**	**7**	**8**	**5**	**480**	**1050**	**42**	**42**	**21,20**

4.2 List of optional blocks

4.2.1 List of general education blocks

4.2.1.1 Liberal-managerial classes blocks *(min. 4 ECTS points):*

No.	Subject/group of classes code	Name of subject/group of classes (denote group of classes with symbol **GK**)	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form[2] of subject/group of classes	Way[3] of crediting	Subject/group of classes			
			lec	cl	lab	pr	sem		ZZU	CNPS	Total	DN[5] classes	BU[1] classes			University-wide[4]	Concerning scientific activities[5]	Practical[6]	Type[7]
1.	IZZ-SM2ZPRBKS	**Social competences module**					2		30	50	2	2	1,28	T	Z		DN	P(2)	KO
	W08IZZ-SM0024S	Training of creativity and creative thinking techniques					2	K2_IZ_W12,16, U10,11,22,23, K1-3,5,7	30	50	2	2		T	Z		DN	P	KO
	W08IZZ-SM0023S	Conflict resolving and negotiations					2	K2_IZ_W12,16 U10,11,22,23, K1-5,7	30	50	2	2		T	Z		DN	P	KO
	W08IZZ-SM0022S	Organization and management of work time					2	K2_IZ_W12,16, U10,11,22,23, K1-3,5,7	30	50	2	2		T	Z		DN	P	KO
	W08IZZ-SM0021S	Negotiations in business					2	K2_IZ_W12,16, U10,11,22,23, K1-3,5,7	30	50	2	2		T	Z		DN	P	KO
2.	IZZ-SM2ZPRBKP	**Leadership competences module**	1				1		30	50	2	2	1,36	T	Z		DN	P(1)	KO
	W08IZZ-SM0027W	Leaderdhip psychology	1					K2_IZ_W12,16 U10,11,22,23 K1-5,7	15	25	1	1		T/Z	Z		DN		KO

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final subject form (lec, cl, lab, pr, sem)
[4]University-wide subject /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

	W08IZZ-SM0027S	Leaderdhip psychology					1	K2_IZ_W12,16 U10,11,22,23 K1-5,7	15	25	1	1		T	Z		DN	P	KO
	W08IZZ-SM0025W	Decision and risk taking	1					K2_IZ_W12,16 U10,11,16,18, 19,22,23,K1-5,7	15	25	1	1		T/Z	Z		DN		KO
	W08IZZ-SM0025S	Decision and risk taking					1	K2_IZ_W12,16 U10,11,16,18, 19,22,23,K1-5,7	15	25	1	1		T	Z		DN	P	KO
	W08IZZ-SM0026W	Strategic decisions of leadership	1					K2_IZ_W12,16 U10,11,16-19,22,23,K1-5,7	15	25	1	1		T/Z	Z		DN		KO
	W08IZZ-SM0026S	Strategic decisions of leadership					1	K2_IZ_W12,16 U10,11,16-19,22,23,K1-5,7	15	25	1	1		T	Z		DN	P	KO
		Total	**1**	**0**	**0**	**0**	**3**		**60**	**100**	**4**	**4**	**2,64**						

4.2.1.2 *Foreign languages* block *(min. 3 ECTS points):*

No.	Subject/ group of classes code	Name of subject/group of classes (denote group of classes with symbol **GK**)	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form[2] of subject/group of classes	Way[3] of crediting	Subject/group of classes			
			lec	cl	lab	pr	sem		ZZU	CNPS	Total	DN[5] classes	BU[1] classes			University-wide[4]	Concerning scientific activities[5]	Practical[6]	Type[7]
		Foreign language II (B2+)		1				K2_IZ_U10-14, K2_IZ_K1	15	30	1		0,5	T	Z	O		P	KO
		Foreign language I (A1 or A2)		3				K2_IZ_U10-14, K2_IZ_K1	45	60	2		1,5	T	Z	O		P	KO
		Total	**0**	**4**	**0**	**0**	**0**		**60**	**90**	**3**		**2,0**						

4.2.1.3 Sporting classes block *(0 ECTS points):*

No.	Subject/ group of classes code	Name of subject/group of classes (denote group of classes with symbol **GK**)	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form[2] of subject/group of classes	Way[3] of crediting	Subject/group of classes			
			lec	cl	lab	pr	sem		ZZU	CNPS	Total	DN[5] classes	BU[1] classes			University-wide[4]	Concerning scientific activities[5]	Practical[6]	Type[7]
		Total																	

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final subject form (lec, cl, lab, pr, sem)
[4]University-wide subject /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

4.2.1.4 *Information technologies* block *(min. .... ECTS points):*

No.	Subject/ group of classes code	Name of subject/group of classes (denote group of classes with symbol **GK**)	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form[2] of subject/group of classes	Way[3] of crediting	Subject/group of classes			
			lec	cl	lab	pr	sem		ZZU	CNPS	Total	DN[5] classes	BU[1] classes			University-wide[4]	Concerning scientific activities[5]	Practical[6]	Type[7]
		Total																	

Altogether for general education blocks:

Total number of hours					Total number of ZZU hours	Total number of CNPS hours	Total number of ECTS points	Total number of ECTS points for DN classes[5]	Number of ECTS points for BU classes[1]
lec	cl	lab	pr	sem					
1	**4**	**0**	**0**	**3**	**120**	**190**	**7**	**4**	**4,64**

4.2.2 List of basic sciences blocks

4.2.2.1 *Mathematics* block *(min. .... ECTS points):*

No.	Subject/ group of classes code	Name of subject/group of classes (denote group of classes with symbol **GK**)	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form[2] of subject/group of classes	Way[3] of crediting	Subject/group of classes			
			lec	cl	lab	pr	sem		ZZU	CNPS	Total	DN[5] classes	BU[1] classes			University-wide[4]	Concerning scientific activities[5]	Practical[6]	Type[7]
		Total																	

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final subject form (lec, cl, lab, pr, sem)
[4]University-wide subject /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

4.2.2.2 ***Physics*** **block** *(min. .... ECTS points):*

No.	Subject/group of classes code	Name of subject/group of classes (denote group of classes with symbol **GK**)	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form[2] of subject/group of classes	Way[3] of crediting	Subject/group of classes			
			lec	cl	lab	pr	sem		ZZU	CNPS	Total	DN[5] classes	BU[1] classes			University-wide[4]	Concerning scientific activities[5]	Practical[6]	Type[7]
1.	IZZ-SM3ZPRBNF	**Physical science module**	0(1)		0(1)	2(0)			30	50	2	2	1,36	T	Z		DN	P(1)	PD
	W08IZZ-SM0028P	Technical physics of work environment				2		K2_IZ_W11, U10,11,20,21 K2_IZ_K1	30	50	2	2	1,36	T	Z		DN	P	PD
	W08IZZ-SM0029W	Physics of complex systems	1					K2_IZ_W11, U10,11,20,21 K2_IZ_K1	15	25	1	1	0,68	T/Z	Z		DN	P	PD
	W08IZZ-SM0029L	Physics of complex systems			1			K2_IZ_W11, U10,11,20,21 K2_IZ_K1	15	25	1	1	0,68	T	Z		DN	P	PD
		Total	**0(1)**		**0(1)**	**2(0)**			**30**	**25**	**2**	**2**	**1,36**						

4.2.2.3 ***Chemistry*** **block** *(min. .... ECTS points):*

No.	Subject/ group of classes code	Name of subject/group of classes (denote group of classes with symbol **GK**)	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form[2] of subject/group of classes	Way[3] of crediting	Subject/group of classes			
			lec	cl	lab	pr	sem		ZZU	CNPS	Total	DN[5] classes	BU[1] classes			University-wide[4]	Concerning scientific activities[5]	Practical[6]	Type[7]
Total																			

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final subject form (lec, cl, lab, pr, sem)
[4]University-wide subject /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

Altogether

Total number of hours					Total number of ZZU hours	Total number of CNPS hours	Total number of ECTS points	Total number of ECTS points for DN classes[5]	Number of ECTS points for BU classes[1]
lec	cl	lab	pr	sem					
0(1)	**0**	**0(1)**	**2(0)**	**0**	**30**	**50**	**2**	**2**	**1,36**

4.2.3 List of blocks

4.2.3.1 Diploma profile block *(min. 16 ECTS points):*

No.	Subject/ group of classes code	Name of subject/group of classes (denote group of classes with symbol **GK**)	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form[2] of subject/group of classes	Way[3] of crediting	Subject/group of classes			
			lec	cl	lab	pr	sem		ZZU	CNPS	Total	DN[5] classes	BU[1] classes			University-wide[4]	Concerning scientific activities[5]	Practical[6]	Type[7]
1.	W08IZZ-SM0012S	Diploma seminar					1	K2_IZ_U4-8,10,11,26, K1,6,7	15	50	2	2	0,68	T	Z		DN	P	K
2.	W08IZZ-SM0068D	Diploma thesis				1		K2_IZ_U10, 11,26, K1,6,7	12	350	14	14	3,48	T/Z	Z		DN	P	K
		Total	**0**	**0**	**0**	**1**	**1**		**27**	**400**	**16**	**16**	**4,16**						

Altogether for blocks:

Total number of hours					Total number of ZZU hours	Total number of CNPS hours	Total number of ECTS points	Total number of ECTS points for DN classes[5]	Number of ECTS points for BU classes[1]
lec	cl	lab	pr	sem					
0	**0**	**0**	**1**	**1**	**27**	**400**	**16**	**16**	**4,16**

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final subject form (lec, cl, lab, pr, sem)
[4]University-wide subject /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

4.2.4 List of specialization blocks

4.2.4.1 *Specialization classes (e.g. whole specialization)* blocks *(min. 14 ECTS points):*

No.	Subject/ group of classes code	Name of subject/group of classes (denote group of classes with symbol **GK**)	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form[2] of subject/group of classes	Way[3] of crediting	Subject/group of classes			
			lec	cl	lab	pr	sem		ZZU	CNPS	Total	DN[5] classes	BU[1] classes			University-wide[4]	Concerning scientific activities[5]	Practical[6]	Type[7]
1.	W08IZZ-SM0009W	Project team management	1					K2_IZ_W3,8,10,15 U6,10,11,17,19,22,27 K1-7	15	25	1	1	0,68	T/Z	Z		DN		S
2.	W08IZZ-SM0009S	Project team management					2	K2_IZ_W3,8,10,15 U6,10,11,17,19,22,27 K1-7	30	50	2	2	1,28	T	Z		DN	P	S
3.	W08IZZ-SM0065G	Project management - case studies **GK**				1	2	K2_IZ_W9,15,16 U10,11,19,22,27, K1,6,7	45	50	2	2	1,96	T	Z		DN	P	S
4.	W08IZZ-SM0013W	Advanced project management	2					K2_IZ_W12,13,16U10,11,19,22,23,27, K1-7	30	75	3	3	1,36	T/Z	E		DN		S
5.	W08IZZ-SM0013L	Advanced project management			2			K2_IZ_W12,13,16U10,11,19,22,23,27, K1-7	30	50	2	2	1,28	T	Z		DN	P	S
6.	W08IZZ-SM0013P	Advanced project management				2		K2_IZ_W12,13,16U10,11,19,22,23,27, K1-7	30	50	2	2	1,28	T	Z		DN	P	S
7.	W08IZZ-SM0018G	Project management – simulation games **GK**	1		1			K2_IZ_W15,16 U10,11,19,22, 27, K1-7	30	50	2	2	1,36	T	Z		DN	P (1)	S
8.	W08IZZ-SM0067G	Sustainable project management	1					K2_IZ_W15 K2_IZ_U27	15	25	1	1	0,68	T/Z	Z		DN		S
				1				K2_IZ_W15 K2_IZ_U27	15	25	1	1	0,68	T	Z		DN	P	S
		Total	**4**	**0**	**3**	**3**	**4**		**240**	**400**	**16**	**16**	**10,56**						

Altogether for specialization blocks:

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final subject form (lec, cl, lab, pr, sem)
[4]University-wide subject /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

Total number of hours					Total number of ZZU hours	Total number of CNPS hours	Total number of ECTS points	Total number of ECTS points for DN classes[5]	Number of ECTS points for BU classes[1]
lec	cl	lab	pr	sem					
5	**1**	**3**	**3**	**4**	**240**	**400**	**16**	**16**	**10,56**

4.3 Training block - concerning principles of training crediting – attachment no. …

Opinion of the Advisory Faculty Council concerning the rules of crediting training block

Name of training			
Number of ECTS points	**Number of ECTS points for BU[1] classes**	**Training crediting mode**	**Code**
Training duration	**Training objective**		

4.4 „Diploma dissertation" block (*if it is foreseen at first level studies)*

Type of diploma dissertation	magister inżynier	
Number of diploma dissertation semesters	**Number of ECTS points**	**Code**
2	**2** **14**	**W08IZZ-SM0012S Diploma seminar** **W08IZZ-SM0068D Diploma thesis**
Character of diploma dissertation		
Project		
Number of BU[1] ECTS points	**4,16**	
Number of DN[5] ECTS points	**16**	

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final subject form (lec, cl, lab, pr, sem)
[4]University-wide subject /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

5. Ways of verifying assumed learning outcomes

Type of classes	Ways of verifying assumed learning outcomes
lecture	Examination or colloquium or other form indicated in the subject charter
classses	Colloquium (knowledge test or open questions); solving tasks; literature and case studies, diagnostic or project reports - empirical research in real organizations, opinions of representatives of these organizations; oral presentations with the use of modern means of communication; other form indicated in the subject charter
laboratory	Report on tasks performed, knowledge test; other form indicated in the subject charter
project	Written report documenting the diagnostic-project solution, presentation of the project and its defense; other form indicated in the subject charter
seminar	Selection - formulation of the problem - topic; activity in discussion, written elaboration in the form of a scientific paper, essay, "mini" monograph; oral presentations using modern means of communication; other form indicated in the subject charter
internship	not applicable

6. Range of diploma examination

Programming in the data analysis

1. Data types in Python language

1.1. What differentiates lists from dictionaries in Python? Provide two differences and at least one usage example where one data structure is preferable over the other.

2. Data structures in the Python library pandas

2.1. What data structures are available in Pandas? List the reasons why it's more beneficial to use them in data analysis than built-in structures.

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final subject form (lec, cl, lab, pr, sem)
[4]University-wide subject /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

Business simulation

3. The concept of simulation. Stages of the simulation approach
3.1. What is a simulation and what are its primary objectives? Enumerate and discuss the stages of simulation research.
4. Main simulation methods in management
4.1 Name and classify the most crucial simulation methods used in management. Describe one of them and provide examples of their applications.

Methods of e-business support

5. Marketing tools for promoting an online store
5.1. Enumerate and elaborate on the promotional tools for online stores.
6. The functional structure of an online store
6.1. Discuss the functional structure of an online store (back-end and front-end).

Cloud computing services

7. Types and applications of cloud services for business. Advantages, disadvantages, security.
7.1. Discuss the types and applications of Microsoft cloud services.
7.2. Discuss the various types and applications of Google's cloud services.

Value and financial decisions engineering

8. Methods of estimating the cost of capital
8.1. Describe the principles of the Capital Asset Pricing Model (CAPM).
9. Methods of valuing a company
9.1. Discuss the stages of estimating the value of a company in the income approach (DCF method).

Project team management

10. Selection of project team members
10.1. Enumerate and describe the guidelines and criteria for selecting project team members.
11. Project team structures
11.1. List typical project team structures and characterize one, considering its pros and cons

Project management - case studies

12. IT project management
12.1. Describe at least three methods of project management using an IT project as an example.

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final subject form (lec, cl, lab, pr, sem)
[4]University-wide subject /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
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13. Managing different types of projects

13.1. Compare the approaches used in managing different types of projects (business, IT, social, public, scientific, etc.).

Business psychology

14. Work motivation

14.1. Discuss external and internal motivators at work.

15. Dysfunctional employee behaviors

15.1. Describe three dysfunctional behaviors of employees.

Creative design

16. Design thinking

16.1. Explain the principles of design thinking.

17. Critical and affirmative design

17.1. What are the differences between affirmative and critical design?

Econometric modelling and forecasting

18. Identification of time series model

18.1. What is correlation and partial correlation? Explain how they can be used in identifying autoregressive (AR) and moving average (MA) models.

19. Verification of time series model

19.1. What are the residuals of a model and what properties should they possess?

Web scraping and data analysis

20. Methods of acquiring data from websites

20.1. Explain the process of parsing HTML content and the tools you would use for this purpose.

20.2. Explain the process of data extraction via the Application Programming Interface (API), and highlight the pros and cons of this approach?

Business management 1. Strategy and business model of the enterprise

21. Lean Startup method

21.1. Discuss the significance and stages of the Lean Startup method.

22. Company business model

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final subject form (lec, cl, lab, pr, sem)
[4]University-wide subject /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

22.1. Explain the concept and discuss the components of a selected business model (for example, the Business Model Canvas template).

Business management 2: Financing the development of business

23. Company financing

23.1. Discuss the models and challenges of financing newly established companies.

23.2 Provide a characterization of the different stages involved in financing micro-enterprises.

Advanced project management

24. Sustainable project management

24.1. Explain the major implications of the three pillars of sustainability for traditional project management processes.

25. Project success and its measurement

25.1 Assuming that project success is defined based on value delivered to stakeholders, illustrate the principles of selecting metrics for a project.

26. Organizational maturity in project management

26.1. Present S.Spałka's maturity model for project management.

Project management – simulation games

27. Project life cycle

27.1. Define the project life cycle and discuss its phases considering a chosen project management methodology (e.g., PMBoK, PRINCE2)

27.2 List and explain the fundamental project documents that are produced during the initiation and planning phases of a project.

Integrated management information systems

28. ERP and MRP II class systems

28.1. Identify the differences between MRP II and ERP systems

29. Implementation process of ERP systems

29.1 Discuss the primary steps in implementing an ERP system.

Business management III: Contemporary marketing

30. Modern marketing communication

30.1. Enumerate and discuss selected contemporary marketing communication concepts.

31. Brand management in e-marketing

31.1. Enumerate and discuss methods of brand creation in digital marketing.

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes

[2]Traditional – enter T, remote – enter Z

[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final subject form (lec, cl, lab, pr, sem)

[4]University-wide subject /group of classes – enter O

[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned

[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes

[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

Sustainable project management

32. Essence of sustainable project management

32.1 Explain the major implications of the three pillars of sustainability for traditional project management processes.

Physical science module

Physics of complex systems

33. Models of complex systems

33.1. Provide an example of a complex system model and describe its application.

Technical physics of work environment

34. Impact of physical environment on an employee

34.1. How do you interpret PMV and PPD indicator values when assessing workplace microclimate quality?

34.2. Discuss the organizational strategies implemented to mitigate noise exposure in the workplace.

Social competences module

Training of creativity and creative thinking techniques

35. Determinants of creativity

35.1. Discuss factors influencing individual and team/organizational creativity.

36. Techniques supporting creative thinking

36.1. List several and discuss one group technique that fosters creativity within a team.

Conflict resolving and negotiations

37. Behavior styles in conflicts

37.1. Discuss the differences between competitive and cooperative styles in the Thomas-Kilmann conflict model.

38. Negotiation process

38.1. What does the process of preparing a negotiation team entail?

Organization and management of work time

39. Time management at work

39.1. Provide the fundamental principles of effective time management at work.

40. Task prioritization at work

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes

[2]Traditional – enter T, remote – enter Z

[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final subject form (lec, cl, lab, pr, sem)

[4]University-wide subject /group of classes – enter O

[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned

[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes

[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

40.1. Discuss methods of prioritizing tasks at work..

Negotiations in business

41. Positional negotiations
41.1. Discuss the structure of relationships in positional negotiations.
42. Negotiation strategies and techniques
42.1. Present techniques for countering objections in negotiations.

Leadership competences module

Leadership psychology

43. Effective leadership
43.1. List the five most significant leadership traits or behaviors.
44. Dysfunctional leadership
44.1. Provide three characteristics of Machiavellian leaders.

Decision and risk taking

45. Prospect theory in decision-making
45.1. Discuss the foundational assumptions of prospect theory in decision-making.
46. Risk perception in decision-making
46.1. Discuss quantitative and qualitative dimensions of risk perception in decision-making.

Strategic decisions of leadership

47. Innovative strategy in the company
47.1. Explain the importance of an innovative strategy in business management.
48. Leadership in management
48.1. Characterize the role of leadership in contemporary company management.

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final subject form (lec, cl, lab, pr, sem)
[4]University-wide subject /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

7. Requirements concerning deadlines for crediting classes/groups of classes for all classes in particular blocks

No.	*Subject / group of classes code*	*Name of subject / group of classes*	*Crediting by deadline of... (number of semester)*

8. Plan of studies (attachment no. 4)

Approved by faculty student government legislative body:

....
Date name and surname, signature of student representative

....
Date Dean’s signature

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final subject form (lec, cl, lab, pr, sem)
[4]University-wide subject /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

Zał. nr 4 do ZW 78/2023
Attachment no. 3 to Program of Studies

PLAN OF STUDIES

FACULTY: MANAGEMENT

MAIN FIELD OF STUDY: BUSINESS ENGINEERING

EDUCATION LEVEL: second-level studies

FORM OF STUDIES: full-time studies

PROFILE: general academic

SPECIALIZATION: PROJECT MANAGEMENT

LANGUAGE OF STUDY: POLISH

In effect since 2023/2024

Plan of studies structure (optionally)

1) in ECTS point layout

25	Foreign language II (B2+) (1)			25
24	Psychologia biznesu (2)	Diploma seminar (2)		24
23		Econometric Modelling and Forecasting (5)		23
22	Programming in data analysis (3)			22
21				21
20				20
19	Business simulation (4)	Web scraping and data analysis (3)		19
18				18
17		Leadership competences module (2)	Foreign language I (A1 lub A2) (2)	17
16	Cloud computing services (4)			16
15		Social competences module (2)		15
14	Methods of e-business support (3)		Research workshop (1)	14
13		Business management 2: Financing the development of business (5)	Diploma thesis (14)	13
12	Value and financial decisions engineering (6)		Physics of compex systems (2) Technical physics of work env. (2)	12
11				11
10			Integrated Management Information Systems (2)	10
9		Business management 1. Strategy and business model of the enterprise (4)		9
8	Creative design (2)		Business management III: Contemporary marketing (5)	8
7				7
6	Project team management (3)	Advanced project management (7)		6
5				5
4			Sustainable project management (2)	4
3	Project management - case studies (2)			3
2			Project management – simulation games (2)	2
1				1

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final subject form (lec, cl, lab, pr, sem)
[4]University-wide subject /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

2) in hourly layout

25	Foreign language II (B2+) (01000)			25
24	Psychologia biznesu (10001)	Diploma seminar (00001)		24
23		Econometric Modelling and Forecasting (20200)		23
22	Programming in data analysis (10200)			22
21				21
20				20
19	Business simulation (10200)	Web scraping and data analysis (10100)		19
18				18
17		Leadership competences module (10001)	Foreign language I (A1 lub A2) (03000)	17
16	Cloud computing services (00101)			16
15		Social competences module (00002)		15
14	Methods of e-business support (10010)		Research workshop (00001)	14
13		Business management 2: Financing the development of business (10030)	Diploma thesis (00010)	13
12	Value and financial decisions engineering (22000)		Physics of compex systems (10100)	12
11			Technical physics of work env. (00020)	11
10			Integrated Management Information Systems (10100)	10
9		Business management 1. Strategy and business model of the enterprise (10020)		9
8	Creative design (00002)		Business management III: Contemporary marketing (10021)	8
7				7
6	Project team management (10002)	Advanced project management (20220)		6
5				5
4			Sustainable project management (1100O)	4
3	Project management - case studies (00012)			3
2			Project management – simulation games (11000)	2
1				1

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final subject form (lec, cl, lab, pr, sem)
[4]University-wide subject /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

1. Set of obligatory and optional classes and groups of classes in semestral arrangement

Semester 1

Obligatory subject / groups of classes Number of ECTS points 24

No.	Subject/ group of classes code	Name of subject/group of classes (denote group of classes with symbol **GK**)	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form[2] of subject/group of classes	Way[3] of crediting	Subject/group of classes			
			lec	cl	lab	pr	sem		ZZU	CNPS	Total	DN[5] classes	BU[1] classes			University-wide[4]	Concerning scientific activities[5]	Practical[6]	Type[7]
1.	W08IZZ-SM0003G	Programming in the data analysis **GK**	1		2			K2_IZ_W2,3, U2,9-11, K1	45	75	3	3	1,96	lec:T/Z lab:T	Z		DN	P (2)	K
2.	W08IZZ-SM0005G	Business simulation **GK**	1		2			K2_IZ_W1, U1,4,5,10,11, K1	45	100	4	4	1,96	lec:T/Z lab::T	Z		DN	P (3)	K
3.	W08IZZ-SM0007G	Cloud computing services **GK**			1		1	K2_IZ_W3 U3,6,10,11,K1	30	100	4	4	1,36	T	Z		DN	P (4)	K
4.	W08IZZ-SM0004W	Business psychology	1					K2_IZ_W12,16 U10,11,22,23 K2_IZ_K1-5,7	15	25	1	1	0,68	T/Z	Z		DN		KO
5.	W08IZZ-SM0004S	Business psychology					1	K2_IZ_W12,16 U10,11,22,23 K2_IZ_K1-5,7	15	25	1	1	0,68	T	Z		DN	P	KO
6.	W08IZZ-SM0002W	Methods of e-business support	1					K2_IZ_W3, U2,3,10,11, K1	15	25	1	1	0,68	T/Z	Z		DN		K
7.	W08IZZ-SM0002P	Methods of e-business support				1		K2_IZ_W3, U2,3,10,11, K1	15	50	2	2	0,68	T	Z		DN	P	K
8.	W08IZZ-SM0001W	Value and financial decisions engineering	2					K2_IZ_W7,10 U7,10,11,15,16,18,19,24,25,K1	30	100	4	4	1,36	T/Z	E		DN		K
9.	W08IZZ-SM0001C	Value and financial decisions engineering		2				K2_IZ_W7,10 U7,10,11,15,16,18,19,24,25,K1	30	50	2	2	1,28	T	Z		DN	P	K
10.	W08IZZ-SM0006S	Creative design					2	K2_IZ_W9, U10,11,16,18,19,22,23, K1-3,5-7	30	50	2	2	1,28	T	Z		DN	P	K
		Total	**6**	**2**	**5**	**1**	**4**		**270**	**600**	**24**	**24**	**11,92**						

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final subject form (lec, cl, lab, pr, sem)
[4]University-wide subject /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

Optional classes / groups of classes (minimum 105 hours in semester, 6 ECTS points)

No.	Subject/ group of classes code	Name of subject/group of classes (denote group of classes with symbol **GK**)	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form[2] of subject/group of classes	Way[3] of crediting	Subject/group of classes			
			lec	cl	lab	pr	sem		ZZU	CNPS	Total	DN[5] classes	BU[1] classes			University-wide[4]	Concerning scientific activities[5]	Practical[6]	Type[7]
1.	W08IZZ-SM0009W	Project team management	1					K2_IZ_W3,8,10,15 U6,10,11,17,19,22,27 K1-7	15	25	1	1	0,68	T/Z	Z		DN		S
2.	W08IZZ-SM0009S	Project team management					2	K2_IZ_W3,8,10,15 U6,10,11,17,19,22,27 K1-7	30	50	2	2	1,28	T	Z		DN	P	S
3.	W08IZZ-SM0065G	Project management - case studies				1	2	K2_IZ_W9,15,16 U10,11,19,22,27, K1,6,7	45	50	2	2	1,96	T	Z		DN	P	S
4.		Foreign language II (B2+)		1				K2_IZ_U10-14, K2_IZ_K1	15	30	1		0,5	T	Z	O		P	KO
		Razem	**1**	**1**	**0**	**0**	**4**		**105**	**155**	**6**	**5**	**4,42**						

Altogether in semester

Total number of hours					Total number of ZZU hours	Total number of CNPS hours	Total number of ECTS points	Total number of ECTS points for DN classes[5]	Number of ECTS points for BU classes[1]
lec	cl	lab	pr	sem					
7	**3**	**5**	**2**	**8**	**375**	**755**	**30**	**29**	**16,34**

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final subject form (lec, cl, lab, pr, sem)
[4]University-wide subject /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

Semester 2

Obligatory classes / groups of classes Number of ECTS points 17

No.	Subject/ group of classes code	Name of subject/group of classes (denote group of classes with symbol **GK**)	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form[2] of subject/group of classes	Way[3] of crediting	Subject/group of classes			
			lec	cl	lab	pr	sem		ZZU	CNPS	Total	DN[5] classes	BU[1] classes			University-wide[4]	Concerning scientific activities[5]	Practical[6]	Type[7]
1.	W08IZZ-SM0011G	Web scraping and data analysis **GK**	1		1			K2_IZ_W2 U2,6,7,10,11 K2_IZ_K1,6	30	75	3	3	1,36	lec:T/Z lab:T	Z		DN	P (2)	K
2.	W08IZZ-SM0010W	Econometric modelling and forecasting	2					K2_IZ_W4,5 U1,5,8-11,K1	30	50	2	2	1,28	T/Z	Z		DN		PD
3.	W08IZZ-SM0010L	Econometric modelling and forecasting			2			K2_IZ_W4,5 U1,5,8-11,K1	30	75	3	3	1,28	T	Z		DN	P	PD
4.	W08IZZ-SM0014W	Business management 1. Strategy and business model of the enterprise	1					K2_IZ_W6,7,9,14,U7, 10,11,15-19,24,25,K1	15	50	2	2	0,76	T/Z	E		DN		K
5.	W08IZZ-SM0014P	Business management 1. Strategy and business model of the enterprise				2		K2_IZ_W6,7,9,14,U7, 10,11,15-19,24,25,K1	30	50	2	2	1,28	T	Z		DN	P	K
6.	W08IZZ-SM0015W	Business management 2: Financing the development of business	1					K2_IZ_W6,7,9,13,14, U7,10,11,15-19,24,25,K1	15	50	2	2	0,68	T/Z	Z		DN		K
7.	W08IZZ-SM0015P	Business management 2: Financing the development of business				3		K2_IZ_W6,7,9,13,14, U7,10,11,15-19,24,25,K1	45	75	3	3	1,88	T	Z		DN	P	K
		Total	**5**	**0**	**3**	**5**	**0**		**195**	**425**	**17**	**17**	**8,52**						

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final subject form (lec, cl, lab, pr, sem)
[4]University-wide subject /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

Optional classes / groups of classes (minimum 165 hours in semester, 13 ECTS points)

No.	Subject/ group of classes code	Name of subject/group of classes (denote group of classes with symbol **GK**)	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form[2] of subject/group of classes	Way[3] of crediting	Subject/group of classes			
			lec	cl	lab	pr	sem		ZZU	CNPS	Total	DN[5] classes	BU[1] classes			University-wide[4]	Concerning scientific activities[5]	Practical[6]	Type[7]
1.	W08IZZ-SM0013W	Advanced project management	2					K2_IZ_W12,13,16U10,11,19,22,23,27, K1-7	30	75	3	3	1,36	T/Z	E		DN		S
2.	W08IZZ-SM0013L	Advanced project management			2			K2_IZ_W12,13,16U10,11,19,22,23,27, K1-7	30	50	2	2	1,28	T	Z		DN	P	S
3.	W08IZZ-SM0013P	Advanced project management				2		K2_IZ_W12,13,16U10,11,19,22,23,27, K1-7	30	50	2	2	1,28	T	Z		DN	P	S
4.	W08IZZ-SM0012S	Diploma Seminar					1	K2_IZ_U4-8,10,11,26, K1,6,7	15	50	2	2	0,68	T	Z		DN	P	K
5.	IZZ-SM2ZPRBKS	**Social competences module**					2		30	50	2	2	1,28	T	Z		DN	P(2)	KO
	W08IZZ-SM0024S	Training of creativity and creative thinking techniques					2	K2_IZ_W12,16, U10,11,22,23, K1-3,5,7	30	50	2	2	1,28	T	Z		DN	P	KO
	W08IZZ-SM0023S	Conflict resolving and negotiations					2	K2_IZ_W12,16 U10,11,22,23, K1-5,7	30	50	2	2	1,28	T	Z		DN	P	KO
	W08IZZ-SM0022S	Organization and management of work time					2	K2_IZ_W12,16, U10,11,22,23, K1-3,5,7	30	50	2	2	1,28	T	Z		DN	P	KO
	W08IZZ-SM0021S	Negotiations in business					2	K2_IZ_W12,16, U10,11,22,23, K1-3,5,7	30	50	2	2	1,28	T	Z		DN	P	KO
6.	IZZ-SM2ZPRBKP	**Leadership competences module**	1				1		30	50	2	2	1,36	T	Z		DN	P(1)	KO

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final subject form (lec, cl, lab, pr, sem)
[4]University-wide subject /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

	W08IZZ-SM0027W	Leaderdhip psychology	1					K2_IZ_W12,16 U10,11,22,23 K1-5,7	15	25	1	1		T/Z	Z		DN		KO
	W08IZZ-SM0027S	Leaderdhip psychology					1	K2_IZ_W12,16 U10,11,22,23 K1-5,7	15	25	1	1		T	Z		DN	P	KO
	W08IZZ-SM0025W	Decision and risk taking	1					K2_IZ_W12,16 U10,11,16,18, 19,22,23,K1-5,7	15	25	1	1		T/Z	Z		DN		KO
	W08IZZ-SM0025S	Decision and risk taking					1	K2_IZ_W12,16 U10,11,16,18, 19,22,23,K1-5,7	15	25	1	1		T	Z		DN	P	KO
	W08IZZ-SM0026W	Strategic decisions of leadership	1					K2_IZ_W12,16 U10,11,16-19,22,23,K1-5,7	15	25	1	1		T/Z	Z		DN		KO
	W08IZZ-SM0026S	Strategic decisions of leadership					1	K2_IZ_W12,16 U10,11,16-19,22,23,K1-5,7	15	25	1	1		T	Z		DN	P	KO
		Total	**3(2)**	**0**	**2**	**2**	**3(4)**		**165**	**325**	**13**	**13**	**7,24**						

Altogether in semester

Total number of hours					Total number of ZZU hours	Total number of CNPS hours	Total number of ECTS points	Total number of ECTS points for DN classes[5]	Number of ECTS points for BU classes[1]
lec	cl	lab	pr	sem					
8(7)	**0**	**5**	**7**	**3(4)**	**360**	**750**	**30**	**30**	**15,76**

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final subject form (lec, cl, lab, pr, sem)
[4]University-wide subject /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

Semester 3

Obligatory classes / groups of classes Number of ECTS points 8

No.	Subject/ group of classes code	Name of subject/group of classes (denote group of classes with symbol **GK**)	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form[2] of subject/group of classes	Way[3] of crediting	Subject/group of classes			
			lec	cl	lab	pr	sem		ZZU	CNPS	Total	DN[5] classes	BU[1] classes			University-wide[4]	Concerning scientific activities[5]	Practical[6]	Type[7]
1.	W08IZZ-SM0066G	Integrated management information systems **GK**	1		1			K2_IZ_W2,3 U3,10,11, K1,6	30	50	2	2	1,36	lec:T/Z lab:T	Z		DN	P (1)	K
2.	W08IZZ-SM0019W	Business management III: Contemporary marketing	1					K2_IZ_W6,7,9,14, U7,10,11,15-19,24,25,K1	15	50	2	1	0,68	T/Z	Z		DN		K
3.	W08IZZ-SM0019P	Business management III: Contemporary marketing				2		K2_IZ_W6,7,9,14, U7,10,11,15-19,24,25,K1	30	50	2	2	1,28	T	Z		DN	P	K
4.	W08IZZ-SM0019S	Business management III: Contemporary marketing					1	K2_IZ_W6,7,9,14, U7,10,11,15-19,24,25,K1	15	25	1	1	0,68	T	Z		DN	P	K
5.	W08IZZ-SM0017S	Research workshop					1	K2_IZ_U8,10,11,26, K1,5,6	15	25	1	1	0,68	T	Z		DN	P	K
		Total	**2**	**0**	**1**	**2**	**2**		**105**	**200**	**8**	**8**	**4,68**						

Optional classes / groups of classes (minimum 165 hours in semester, 21 ECTS points)

No.	Subject/ group of classes code	Name of subject/group of classes (denote group of classes with symbol **GK**)	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form[2] of subject/group of classes	Way[3] of crediting	Subject/group of classes			
			lec	cl	lab	pr	sem		ZZU	CNPS	Total	DN[5] classes	BU[1] classes			University-wide[4]	Concerning scientific activities[5]	Practical[6]	Type[7]
1.	W08IZZ-SM0018G	Project management – simulation games **GK**	1		1			K2_IZ_W15,16 U10,11,19,22, 27, K1-7	30	60	2	2	136	T	Z		DN	P (1)	S
2.	W08IZZ-SM0067G	Sustainable project management	1					K2_IZ_W15, U27	15	25	1	1	0,68	T/Z	Z		DN		S
				1				K2_IZ_W15, U27	15	25	1	1	0,68	T	Z		DN	P	S

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final subject form (lec, cl, lab, pr, sem)
[4]University-wide subject /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

3.		Foreign language I (A1 lub A2)		3				K2_IZ_U10-14, K2_IZ_K1	45	60	2		1,5	T	Z	O		P	KO
4.	W08IZZ-SM0068D	Diploma thesis				1		K2_IZ_U10,11,26, K1,6,7	12	350	14	14	3,48	T	Z		DN	P	K
5.	IZZ-SM3ZPRBNF	**Physical science module**	0(1)		0(1)	2(0)			30	50	2	2	1,36	T	Z		DN	P(1)	PD
	W08IZZ-SM0028P	Technical physics of work environment				2		K2_IZ_W11, U10,11,20,21 K2_IZ_K1	30	60	2	2	1,36	T	Z		DN	P	PD
	W08IZZ-SM0029W	Physics of compex systems	1					K2_IZ_W11, U10,11,20,21 K2_IZ_K1	15	30	1	1	0,68	T/Z	Z		DN	P	PD
	W08IZZ-SM0029L	Physics of compex systems			1			K2_IZ_W11, U10,11,20,21 K2_IZ_K1	15	30	1	1	0,68	T	Z		DN	P	PD
		Total	**2(3)**	**4**	**1(2)**	**3(1)**	**0**		**147**	**560**	**22**	**20**	**9,06**						

Altogether in semester

Total number of hours					Total number of ZZU hours	Total number of CNPS hours	Total number of ECTS points	Total number of ECTS points for DN classes[5]	Number of ECTS points for BU classes[1]
lec	cl	lab	pr	sem					
4(5)	**4**	**2(3)**	**5(3)**	**2**	**252**	**760**	**30**	**28**	**13,74**

2. Set of examinations in semestral arrangement

Subject / group of classes code	Names of classes / groups of classes ending with examination	Semester
W08IZZ-SM0001W	Value and financial decisions engineering	1
W08IZZ-SM0014W	Business management 1. Strategy and business model of the enterprise	2
W08IZZ-SM0013W	Advanced project management	2

3. Numbers of allowable deficit of ECTS points after particular semesters

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final subject form (lec, cl, lab, pr, sem)
[4]University-wide subject /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

Semester	Allowable deficit of ECTS points after semester
1	8
2	15
3	0

Opinion of student government legislative body

....

Date Name and surname, signature of student representative

....

Date Dean’s signature

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final subject form (lec, cl, lab, pr, sem)
[4]University-wide subject /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

BUSINESS INTELLIGENCE

Zał. nr 3 do ZW 78/2023
Attachment no. 2. to the Program of Studies

DESCRIPTION OF THE PROGRAM OF STUDIES

Main field of study: Business Engineering **Profile: general academic**

Level of studies: second-level studies **Form of studies: full-time studies**

1. General description

*1.1 Number of semesters:***3**	*1.2 Total number of ECTS points necessary to complete studies at a given level:****90***
*1.3 Total number of hours:***972**	*1.4 Prerequisites (particularly for second-level studies):* **Graduate at least of first-level studies (bachelor of engineering).** **According to the resolution No. 37/3/2020-2024 of PWr Senate. from 19 November 2020**
1.5 Upon completion of studies graduate obtains professional degree of: ***Master of Science***	*1.6 Graduate profile, employability:* **Description** Responding to the needs of the market, the studies combine managerial competences with the improvement of IT skills. In both specializations, students will improve their skills in analyzing data from the market environment of enterprises, predictive analysis, algorithmic business thinking, cloud services for business, business

	psychology, digital marketing as well as project and business management. The best students will be able to conduct research with our scientists with the prospect of working in an academic environment. At the second degree of Business Engineering (BE), students can deepen their acquired knowledge and extend it by choosing one of two specializations: English-language specialization (Business Intelligence, BI) focused on aspects related to business analytics or Polish-language specialization (Project Management, ZPR) oriented on the management of various types of projects (business, IT, social, public, scientific, etc.). Business Intelligence (BI) is designed to provide students with cutting edge business knowledge and a strong foundation in both analytics – including computational statistics and machine learning – and core business areas, building a solid platform for a successful career. This specialization focuses on how to analyze data in order to identify and predict patterns and on how to visualize and present results to support managerial decisions and lead to innovative thinking in today's organizations. **Acquired skills and competences** Students will learn how to: ● Use data analytics to stimulate business growth with newly discovered quantitative and qualitative skills. ● Stay on top of the latest methods and approaches in computational statistics and machine learning.

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final classes form (lec, cl, lab, pr, sem)
[MS4]University-wide classes /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

	• Use cutting-edge techniques to immerse in case studies and apply new approaches to own data challenges. • Use visualization software to identify trends, explore hypotheses, challenge assumptions, and create a more detailed, data-driven understanding of business activities. • Conduct top-tier research and report the results to managers, peers and the public. • Simulate realistic future paths of all kinds of business processes. • Predict outcomes to enable making informed business decisions and developing winning strategies. • Reach the right customers with the right products and communications. • Leverage the power of data to make informed business decisions and thrive in a rapidly changing environment. **Career** The demand for business analytics is high. Graduates who complete the Business Intelligence program in Business engineering will acquire computational skills and management expertise that the business world is actively seeking. Our program prepares students for data-driven decision support that is crucial for today's business activities across a broad range of industries including ICT, financial, energy and healthcare. The BE curriculum provides the skills to fill positions not only as business intelligence analysts, but also data analysts and consultants, revenue optimization analysts, risk managers, market analysts and many more. Given that the students

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[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final classes form (lec, cl, lab, pr, sem)
[MS4]University-wide classes /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

	will have the opportunity to conduct research with affiliated faculty and senior staff, the program also prepares for careers in Academia.
1.7 Possibility of continuing studies: **doctoral school, postgraduate (post diploma) studies**	*1.8 Indicate connection with University's mission and its development strategy:* Business engineering graduates acquire business, analytical, social and technical competences. The educational program in Business engineering is coherent with the mission of Wrocław University of Science and Technology in the following areas: ● Developing the professionalism and hard skills of graduates in business data analysis and project management that determine the functioning of the TechnoSphere ● Aiming to provide high quality classes and providing the students of Business engineering and lecturers with conditions enabling open discussion and constructive criticism; ● Developing the values and tradition of higher education, wide-ranging cooperation with other universities all over the world via students taking part in scientific conferences and the Erasmus program, and with employers via practical learning, carried out in the form of projects in specific organizations; ● Developing creative, critical and tolerant graduates, as studying a classes in Business engineering emphasizes on appropriate skills and attitudes development; ● Striving to obtain a worthy place in the field of training specialists in the field of management among domestic and foreign universities.

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final classes form (lec, cl, lab, pr, sem)
[MS4]University-wide classes /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

	The Faculty's development plan is in line with the University's strategy. In particular, the Faculty "... combines theoretical, research and expert competences with didactic and educational competences. The Faculty is a leading research and teaching center in Poland and a significant center on an international scale. The didactic and scientific-research profile as well as the quality of education and research in economic and technical sciences ensure it a suitable place in national and international rankings". Conducting Business engineering studies is a permanent element of the Faculty's development strategy. In line with the principle adopted at Wrocław University of Science and Technology, studies in the field of Business engineering have a general academic profile. The study curriculum meets all the requirements resulting from applicable law, including the Polish Qualifications Framework and the characteristics of obtaining engineering competences. In line with the University's strategy, in order to increase the attractiveness of studies on the educational market, the MSc studies education program is unique in that it uses the natural - in economic practice - complementarity of technical and economic education, enriched with an IT module. In accordance with the University's strategy and the Faculty's development plan, which indicate the need for links with the region and the economy, conditions are created and systematic contacts between students and enterprises and other institutions are forced in the didactic process. In line with the University's development strategy, the quality of education is systematically improved. This is achieved thanks to the scientific development of employees and the increase in their teaching competences, as well as thanks to the systematic enrichment of the Faculty's infrastructure, including the modernization of the rooms as well as teaching and laboratory aids.

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final classes form (lec, cl, lab, pr, sem)
[MS4]University-wide classes /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

	At the second degree of studies in the field of Business engineering, the study curriculum includes a set of learning outcomes and the corresponding substantive content of education, enabling graduates to effectively compete on the labor market. Students are prepared to continue their third-cycle studies at the Doctoral School and to conduct their own research. Graduates are also aware of the need to constantly act for their own professional development in cooperation with their home university.

2. Detailed description

2.1 Total number of learning outcomes in the program of study: W (knowledge) =16, U (skills) = 27, K (competences) =7, W + U + K = 50

2.2 For the main field of study assigned to more than one discipline - the number of learning outcomes assigned to the discipline:

D1 Management and quality science (major): 36 (this number must be greater than half the total number of learning outcomes)
D2 Information and Technology Science: 14

2.3 For the main field of study assigned to more than one discipline - percentage share of the number of ECTS points for each discipline:

D1 54,4% ECTS points
D2 45,6 % ECTS points

2.4a. For the general academic profile of the main field of study – the number of ECTS points assigned to the classes related to the University's academic activity in the discipline or disciplines to which the main field of study is assigned – DN (must be greater than 50% of the total number of ECTS points from 1.2) 85

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final classes form (lec, cl, lab, pr, sem)
[MS4]University-wide classes /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

2.4b. For the practical profile of the main field of study - the number of ECTS points assigned to the classes shaping practical skills (must be greater than 50% of the total number of ECTS points from 1.2)

2.5 Concise analysis of compliance of the assumed learning outcomes with the needs of the labor market

The assumed learning outcomes correspond to the requirements set by employers for employees/ graduates on the labor market, in particular in the field of:

- solving decision problems with the use of advanced data analysis methods, optimization and simulation methods with the use of professional IT systems,
- identifying and analyzing the needs of IT system users, managing the implementation of these systems and testing their usability,
- building a project portfolio and managing it in accordance with the goals of the organization,
- identifying, at the level of the entire organization, the real needs of individual business domains, in connection with the overall strategy of the organization,
- identifying and delivering the expected value to customers by managing relationships with them focused on achieving the goals of the organization.

Learning outcomes meet the demand for specialists/ managers prepared for data-driven decision support that is crucial for today's business activities across a broad range of industries including ICT, financial, energy and healthcare. The BI curriculum provides the skills to fill positions not only as business intelligence analysts, but also data analysts and consultants, revenue optimization analysts, risk managers, market analysts and many more. BE graduates are capable of integrating engineering knowledge and skills in the field of management and quality sciences in relation to solving complex substantive and managerial problems. The competences obtained in the classes of education will enable the graduate to effectively carry out tasks in individual areas of the organization's activities, in particular in the field of:

- decision optimization,
- flexibility and risk management,
- supporting managerial decisions,
- information systems management.

The program of studies in the field of Business Engineering at the second-cycle studies and many years of experience of the teaching staff create conditions for the graduates to achieve the assumed learning outcomes and meet the above requirements formulated by employers.

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final classes form (lec, cl, lab, pr, sem)
[MS4]University-wide classes /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

2.6. The total number of ECTS points that a student must obtain in classes requiring direct participation of academic teachers or other persons conducting classes and students (enter the sum of ECTS points for classes / groups of classes marked with the BU[1] code) **45,16 ECTS**

2.7. Total number of ECTS points, which student has to obtain from basic sciences classes

Number of ECTS points for obligatory classes	9
Number of ECTS points for optional classes	0
Total number of ECTS points	9

2.8. Total number of ECTS points, which student has to obtain from practical classes, including project and laboratory classes (enter total number of ECTS points for classes/group of classes denoted with code P)

Number of ECTS points for obligatory classes	27
Number of ECTS points for optional classes	40
Total number of ECTS points	67

2.9. Minimum number of ECTS points, which student has to obtain doing education blocks offered as part of University-wide classes or other main field of study (enter number of ECTS points for classes/groups of classes denoted with code O)

3 ECTS points

2.10. Total number of ECTS points, which student may obtain doing optional blocks (min. 30% of total number of ECTS points)

49 ECTS points

3. Description of the process leading to learning outcomes acquisition:

The process leading to the achievement of the planned learning outcomes is multi-stage, in accordance with the current Academic Regulations, the Program of Studies and the Educational Quality Assurance System, and consists of the following elements:

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final classes form (lec, cl, lab, pr, sem)
[MS4]University-wide classes /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

1. Participation in classes organized at the university – as part of the educational process, acquiring knowledge and skills during lectures, workshops, laboratories, projects and seminars. Classes are carried out individually or in teams, and are conducted in such a way as to allow discussion, presentation of the results of one's own work and learning to solve problems, including those of a research nature, as well as independent thinking and drawing conclusions.
2. Using the university's educational support platform "ePortal" – reading materials published by the teacher and open resources, solving tasks and tests.
3. Group work – within some subjects the student participates in group tasks. He or she then takes part in organizing of the group's work, evaluating the activities of individual participants and takes responsibility for the outcome of the group's work.
4. Self-work – the student completes assigned work in class and at home, and prepares for classes, tests and exams by studying the literature and materials recommended by the teacher.
5. Diploma thesis – the student conducts comprehensive research, analysis and expertise, and then develops a diagnosis and/or design of a solution to solve a managerial problem.
6. Consultations – the student has the opportunity to take advantage of an additional, optional form of education that supports the achievement of learning outcomes, by participating in the office hours of teachers, in order to clarify their doubts and verify the correct understanding of the content of the classes.
7. Verification of knowledge and skills (ongoing and at the end of the semester) – the student, while completing the courses assigned to the program of study, also confirms the achievement of learning outcomes in terms of acquired knowledge, skills and social competencies assigned to the subject.
8. Diploma exam – the student prepares for the final exam by reviewing the material from the entire study. During the exam, the achievement of learning outcomes is verified.
9. Other activities engaging, retraining and expanding knowledge and skills – students have the opportunity to:
– participate in site visits, job fairs, meetings with managers, competitions, etc. (eg. AMA, Praktyczna Strona Biznesu, Your future in Tech, Project Master, IPMA-Student, ABi Akademia Biznesu etc.),
– participate in international student exchanges, and through contact with foreigners studying at the Faculty gain additional interpersonal, cultural and language skills,
– participate in research projects conducted at the Faculty, attend conferences and scientific seminars,
– get involved in the activities of scientific associations and student organizations, thereby gaining valuable interpersonal skills and social competences.

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final classes form (lec, cl, lab, pr, sem)
[MS4]University-wide classes /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

4. List of education blocks:

4.1. List of obligatory blocks:

4.1.1 List of general education blocks

4.1.1.1 *Liberal-managerial classes* block *(min. ..... ECTS points):*

No.	Subject/ group of classes code	Name of subject/group of classes (denote group of classes with symbol **GK**)	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form[2] of subject/group of classes	Way[3] of crediting	Subject/group of classes			
			lec	cl	lab	pr	sem		ZZU	CNPS	Total	DN[5] classes	BU[1] classes			University-wide[4]	Concerning scientific activities[5]	Practical[6]	Type[7]
		Total																	

4.1.1.2 *Foreign languages* block *(min. ..... ECTS points):*

No.	Subject/ group of classes code	Name of subject/group of classes (denote group of classes with symbol **GK**)	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form[2] of subject/group of classes	Way[3] of crediting	Subject/group of classes			
			lec	cl	lab	pr	sem		ZZU	CNPS	Total	DN[5] classes	BU[1] classes			University-wide[4]	Concerning scientific activities[5]	Practical[6]	Type[7]
		Total																	

4.1.1.3 *Sporting classes* block *(0 ECTS points):*

No.	Subject/ group of classes code	Name of subject/group of classes (denote group of classes with symbol **GK**)	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form[2] of subject/group of classes	Way[3] of crediting	Subject/group of classes			
			lec	cl	lab	pr	sem		ZZU	CNPS	Total	DN[5] classes	BU[1] classes			University-wide[4]	Concerning scientific activities[5]	Practical[6]	Type[7]

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final classes form (lec, cl, lab, pr, sem)
[MS4]University-wide classes /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

		Total																	

4.1.1.4 *Information technologies* block *(min. .... ECTS points):*

No.	Subject/ group of classes code	Name of subject/group of classes (denote group of classes with symbol **GK**)	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form[2] of subject/group of classes	Way[3] of crediting	Subject/group of classes			
			lec	cl	lab	pr	sem		ZZU	CNPS	Total	DN[5] classes	BU[1] classes			University-wide[4]	Concerning scientific activities[5]	Practical[6]	Type[7]
		Total																	

Altogether for general education blocks

Total number of hours					Total number of ZZU hours	Total number of CNPS hours	Total number of ECTS points	Total number of ECTS points for DN classes[5]	Number of ECTS points for BU classes[1]
lec	cl	lab	pr	sem					

4.1.2 List of basic sciences blocks

4.1.2.1 *Mathematics* block

No.	Subject/ group of classes code	Name of subject/group of classes (denote group of classes with symbol **GK**)	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form[2] of subject/group of classes	Way[3] of crediting	Subject/group of classes			
			lec	cl	lab	pr	sem		ZZU	CNPS	Total	DN[5] classes	BU[1] classes			University-wide[4]	Concerning scientific activities[5]	Practical[6]	Type[7]
1.	W08IZZ-SM8028W	Descriptive analytics	2					K2_IZ_W2,4,5 U2,8-11, K1	30	100	4	4	1,36	T/Z	E		DN		PD
2.	W08IZZ-SM8028L	Descriptive analytics			2			K2_IZ_W2,4,5 U2,8-11, K1	30	50	2	2	1,28	T	Z		DN	P	PD
		Total	**2**	**0**	**2**	**0**	**0**		**60**	**150**	**6**	**6**	**2,64**						

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final classes form (lec, cl, lab, pr, sem)
[MS4]University-wide classes /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

4.1.2.2 *Physics* block

No.	Subject/ group of classes code	Name of subject/group of classes (denote group of classes with symbol **GK**)	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form[2] of subject/group of classes	Way[3] of crediting	Subject/group of classes			
			lec	cl	lab	pr	sem		ZZU	CNPS	Total	DN[5] classes	BU[1] classes			University-wide[4]	Concerning scientific activities[5]	Practical[6]	Type[7]
1.	W08IZZ-SM8027G	Physics of complex systems **GK**	1		1			K2_IZ_W11 U10,11,20,21 K1	30	75	3	3	1,36	lec:T/Z lab:T	Z		DN	P (2)	PD
		Total	**1**	**0**	**1**	**0**	**0**		**30**	**75**	**3**	**3**	**1,36**						

4.1.2.3 *Chemistry* block

No.	Subject/ group of classes code	Name of subject/group of classes (denote group of classes with symbol **GK**)	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form[2] of subject/group of classes	Way[3] of crediting	Subject/group of classes			
			lec	cl	lab	pr	sem		ZZU	CNPS	Total	DN[5] classes	BU[1] classes			University-wide[4]	Concerning scientific activities[5]	Practical[6]	Type[7]
		Total																	

Altogether for basic sciences blocks:

Total number of hours					Total number of ZZU hours	Total number of CNPS hours	Total number of ECTS points	Total number of ECTS points for DN classes[5]	Number of ECTS points for BU classes[1]
lec	cl	lab	pr	sem					
3	0	3	0	0	90	225	9	9	4

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final classes form (lec, cl, lab, pr, sem)
[MS4]University-wide classes /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

4.1.3 List of the main field of study blocks

4.1.3.1 *Obligatory main field of study* blocks

No.	Subject/ group of classes code	Name of subject/group of classes (denote group of classes with symbol **GK**)	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form[2] of subject/group of classes	Way[3] of crediting	Subject/group of classes			
			lec	cl	lab	pr	sem		ZZU	CNPS	Total	DN[5] classes	BU[1] classes			University-wide[4]	Concerning scientific activities[5]	Practical[6]	Type[7]
1.	W08IZZ-SM8025G	Creative and design thinking workshop **GK**				1	2	K2_IZ_W9 U10,11,18,22,23 K1-7	45	75	3	3	1,96	T	Z		DN	P	K
2.	W08IZZ-SM8035G	Business simulations **GK**	1		2			K2_IZ_W1 U1,4,5,10,11, K1	45	100	4	4	1,96	lec:T/Z lab:T	Z		DN	P(3)	K
3.	W08IZZ-SM8035P	Business simulations				1		K2_IZ_W1 U1,4,5,10,11, K1	15	50	2	2	0,68	T	Z		DN	P	K
4.	W08IZZ-SM8036G	Contemporary economics **GK**	1			1		K2_IZ_W6,7,9,13, 14,U10,11,15,16,18 ,24,25, K1	30	50	2	2	1,36	lec:T/Z lab:T	Z		DN	P (1)	K
5.	W08IZZ-SM8026W	Contemporary management	2					K2_IZ_W6,7,9,13, 14, U10,11,15-18,24,25, K1	30	50	2	2	1,28	T/Z	Z		DN		K
6.	W08IZZ-SM8026S	Contemporary management					2	K2_IZ_W6,7,9,13, 14, U10,11,15-18,24,25, K1	30	50	2	2	1,28	T	Z		DN	P	K
7.	W08IZZ-SM8009G	Digital marketing and social media **GK**	1		2	1		K2_IZ_W7,9 U10,11,15, K1	60	100	4	4	2,64	lec:T/Z lab:T	Z		DN	P (3)	K
8.	W08IZZ-SM8012W	Games and decisions in management	2					K2_IZ_W1,4,5,9,10 U1,5,8-11,26, K1	30	50	2	2	1,28	T/Z	Z		DN		K
9.	W08IZZ-SM8012L	Games and decisions in management			2			K2_IZ_W1,4,5,9,10 U1,5,8-11,26, K1	30	50	2	2	1,28	T	Z		DN	P	K
10.	W08IZZ-SM8014W	Project management	1					K2_IZ_W,8-10,15,16 U10, 11, 17, 19, 22, 27, K1	15	50	2	2	0,76	T/Z	E		DN		K
11.	W08IZZ-SM8014L	Project management			2			K2_IZ_W,8-10,15,16	30	50	2	2	1,28	T	Z		DN	P	K

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final classes form (lec, cl, lab, pr, sem)
[MS4]University-wide classes /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

								U10, 11, 17, 19, 22, 27, K1											
12.	W08IZZ-SM8014P	Project management				1		K2_IZ_W,8-10,15,16 U10, 11, 17, 19, 22, 27, K1	15	50	2	2	0,68	T	Z		DN	P	K
13.	W08IZZ-SM8017G	Cloud computing services **GK**			1		1	K2_IZ_W3 U3,6,10,11, K1	30	50	2	2	1,36	T	Z		DN	P	K
14,	W08IZZ-SM8033S	Research workshop					1	K2_IZ_U8,10,11,26, K1,5,6	15	25	1	1	0,68	T	Z		DN	P	K
		Total	**8**	**0**	**9**	**5**	**6**		**420**	**800**	**32**	**32**	**18,48**						

4.1.3.2 …… block

No.	Subject/ group of classes code	Name of subject/group of classes (denote group of classes with symbol **GK**)	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form[2] of subject/group of classes	Way[3] of crediting	Subject/group of classes			
			lec	cl	lab	pr	sem		ZZU	CNPS	Total	DN[5] classes	BU[1] classes			University-wide[4]	Concerning scientific activities[5]	Practical[6]	Type[7]
		Total																	

Altogether (for main field of study blocks):

Total number of hours					Total number of ZZU hours	Total number of CNPS hours	Total number of ECTS points	Total number of ECTS points for DN classes[5]	Number of ECTS points for BU classes[1]
lec	cl	lab	pr	sem					
8	**0**	**9**	**5**	**6**	**420**	**800**	**32**	**32**	**18,48**

4.2 List of optional blocks

4.2.1 List of general education blocks

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final classes form (lec, cl, lab, pr, sem)
[MS4]University-wide classes /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

4.2.1.1 Liberal-managerial classes blocks *(min. 6 ECTS points):*

No.	Subject/ group of classes code	Name of subject/group of classes (denote group of classes with symbol **GK**)	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form[2] of subject/group of classes	Way[3] of crediting	Subject/group of classes			
			lec	cl	lab	pr	sem		ZZU	CNPS	Total	DN[5] classes	BU[1] classes			University-wide[4]	Concerning scientific activities[5]	Practical[6]	Type[7]
1.	IZZ-SM3BISCM	**Social competences module**					2		30	50	2	2	1,28	T	Z		DN	P	KO
	W08IZZ-SM8023S	Business psychology					2	K2_IZ_W12,16 U7,10,11,22,23, K1-5,7	30	50	2	2	1,28	T	Z		DN	P	KO
	W08IZZ-SM8024S	Leading teams and work groups					2	K2_IZ_W12,16 U7,10,11,22,23 K1-5,7	30	50	2	2	1,28	T	Z		DN	P	KO
2.	IZZ-SM3BIBM	**Business module**	1			1(0)	0(1)		30	50	2	2	1,36	T	Z		DN	P	KO
	W08IZZ-SM8021G	Business planning **GK**	1			1		K2_IZ_W6,7,14 U7,10,11,15-17,24,25 K1	30	50	2	2	1,36	T	Z		DN	P	KO
	W08IZZ-SM8020G	Business models in developing environment **GK**	1			1		K2_IZ_W6,7,14 U10,11,15-18,24,25 K1	30	50	2	2	1,36	T	Z		DN	P	KO
	W08IZZ-SM8022G	Corporate Social Responsibility **GK**	1				1	K2_IZ_W6,7,14 U10,11,15,16,18,24, 25, K1	30	50	2	2	1,36	T	Z		DN	P	KO
3.	IZZ-SM3BIEM	**Ethics module**	1				1		30	50	2		1,36	T	Z			P	KO
	W08IZZ-SM8038	Ethics of new technologies **GK**	1				1	K2_IZ_K7	30	50	2		1,36	T	Z			P	KO
	W08IZZ-SM8037	Ethic of management and new technologies **GK**	1				1	K2_IZ_K7	30	50	2		1,36	T	Z			P	KO
	W08IZZ-SM8039	Business ethics **GK**	1				1	K2_IZ_K7	30	50	2		1,36	T	Z			P	KO
		Total	**2**	**0**	**0**	**1(0)**	**2(3)**		**90**	**150**	**6**	**4**	**4,00**						

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final classes form (lec, cl, lab, pr, sem)
[MS4]University-wide classes /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

4.2.1.2 *Foreign languages* block *(min. 3 ECTS points):*

No.	Subject/ group of classes code	Name of subject/group of classes (denote group of classes with symbol **GK**)	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form[2] of subject/group of classes	Way[3] of crediting	Subject/group of classes			
			lec	cl	lab	pr	sem		ZZU	CNPS	Total	DN[5] classes	BU[1] classes			University-wide[4]	Concerning scientific activities[5]	Practical[6]	Type[7]
1.	JZL	Foreign language (B2+)		1				K2_IZ_U10-14 K2_IZ_K1	15	30	1		0,5	T	Z	O		P	KO
2.	JZL	Foreign language (A1 or A2)		3				K2_IZ_U10-14 K2_IZ_K1	45	60	2		1,5	T	Z	O		P	KO
		Total	**0**	**4**	**0**	**0**	**0**		**60**	**90**	**3**		**2,0**						

4.2.1.3 Sporting classes block *(0. ECTS points):*

No.	Subject/ group of classes code	Name of subject/group of classes (denote group of classes with symbol **GK**)	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form[2] of subject/group of classes	Way[3] of crediting	Subject/group of classes			
			lec	cl	lab	pr	sem		ZZU	CNPS	Total	DN[5] classes	BU[1] classes			University-wide[4]	Concerning scientific activities[5]	Practical[6]	Type[7]
		Total																	

4.2.1.4 *Information technologies* block *(min. .... ECTS points):*

No.	Subject/ group of classes code	Name of subject/group of classes (denote group of classes with symbol **GK**)	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form[2] of subject/group of classes	Way[3] of crediting	Subject/group of classes			
			lec	cl	lab	pr	sem		ZZU	CNPS	Total	DN[5] classes	BU[1] classes			University-wide[4]	Concerning scientific activities[5]	Practical[6]	Type[7]
		Total																	

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final classes form (lec, cl, lab, pr, sem)
[MS4]University-wide classes /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

Altogether for general education blocks:

Total number of hours					Total number of ZZU hours	Total number of CNPS hours	Total number of ECTS points	Total number of ECTS points for DN classes[5]	Number of ECTS points for BU classes[1]
lec	cl	lab	pr	sem					
2	**4**	**0**	**1(0)**	**2(3)**	**150**	**240**	**9**	**4**	**6**

4.2.2 List of basic sciences blocks

4.2.2.1 *Mathematics* block *(min. .... ECTS points):*

No.	Subject/ group of classes code	Name of subject/group of classes (denote group of classes with symbol **GK**)	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form[2] of subject/group of classes	Way[3] of crediting	Subject/group of classes			
			lec	cl	lab	pr	sem		ZZU	CNPS	Total	DN[5] classes	BU[1] classes			University-wide[4]	Concerning scientific activities[5]	Practical[6]	Type[7]
		Total																	

4.2.2.2 *Physics* block *(min. .... ECTS points):*

No.	Subject/ group of classes code	Name of subject/group of classes (denote group of classes with symbol **GK**)	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form[2] of subject/group of classes	Way[3] of crediting	Subject/group of classes			
			lec	cl	lab	pr	sem		ZZU	CNPS	Total	DN[5] classes	BU[1] classes			University-wide[4]	Concerning scientific activities[5]	Practical[6]	Type[7]
		Total																	

4.2.2.3 *Chemistry* block *(min. .... ECTS points):*

No.	Subject/	Name of subject/group of classes (denote group of classes with symbol **GK**)	Weekly number of hours		Number of hours	Number of ECTS points	Form[2] of subject/group of classes	Way[3] of crediting	Subject/group of classes

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final classes form (lec, cl, lab, pr, sem)
[MS4]University-wide classes /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

	group of classes code		lec	cl	lab	pr	sem	Learning effect symbol	ZZU	CNPS	Total	DN[5] classes	BU[1] classes			University-wide[4]	Concerning scientific activities[5]	Practical[6]	Type[7]
		Total																	

Altogether for blocks:

Total number of hours					Total number of ZZU hours	Total number of CNPS hours	Total number of ECTS points	Total number of ECTS points for DN classes[5]	Number of ECTS points for BU classes[1]
lec	cl	lab	pr	sem					

4.2.3 List of blocks

4.2.3.1 ***Diploma profile*** **block** *(min. 16 ECTS points):*

No.	Subject/ group of classes code	Name of subject/group of classes (denote group of classes with symbol **GK**)	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form[2] of subject/group of classes	Way[3] of crediting	Subject/group of classes			
			lec	cl	lab	pr	sem		ZZU	CNPS	Total	DN[5] classes	BU[1] classes			University-wide[4]	Concerning scientific activities[5]	Practical[6]	Type[7]
1.	W08IZZ-SM8032S	Diploma seminar					1	K2_IZ_U10,11,26 K2_IZ_K1,5,6,7	15	50	2	2	0,68	T	Z		DN	P	S
2.	W08IZZ-SM80034D	Diploma Thesis				1		K2_IZ_U10,11,26 K2_IZ_K1,6,7	12	350	14	14	3,48	T/Z	Z		DN	P	S
		Total	**0**	**0**	**0**	**1**	**1**		**27**	**400**	**16**	**16**	**4,16**						

Altogether for blocks:

Total number of hours	Total number of ZZU hours	Total number of CNPS hours	Total number of ECTS points	Total number of ECTS points for DN classes[5]	Number of ECTS points for BU classes[1]

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final classes form (lec, cl, lab, pr, sem)
[MS4]University-wide classes /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

lec	cl	lab	pr	sem					
0	**0**	**0**	**1**	**1**	**27**	**400**	**16**	**16**	**4,16**

4.2.4 List of specialization blocks

4.2.4.1 *Specialization classes (e.g. whole specialization)* blocks *(min. 24 ECTS points):*

No.	Subject/ group of classes code	Name of subject/group of classes (denote group of classes with symbol **GK**)	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form[2] of subject/group of classes	Way[3] of crediting	Subject/group of classes			
			lec	cl	lab	pr	sem		ZZU	CNPS	Total	DN[5] classes	BU[1] classes			University-wide[4]	Concerning scientific activities[5]	Practical[6]	Type[7]
1.	W08IZZ-SM8029G	Business intelligence workplace **GK**	1		2	1		K2_IZ_W1-3, 5 K2_IZ_U3,9-11 K2_IZ_K1	60	125	5	5	2,64	lec:T/Z lab,pr:T	Z		DN	P (4)	S
2.	W08IZZ-SM8013G	Predictive analytics **GK**	2		2			K2_IZ_W1,4,5 U1,5,8-11,26,K1	60	150	6	6	2,64	lec:T/Z lab:T	E (lec)		DN	P (3)	S
3.	W08IZZ-SM8030G	Visual analytics **GK**	1		1	1		K2_IZ_W1-4 U1,2,3,9-11, K1	45	75	3	3	2,04	lec:T/Z lab:T	Z		DN	P (2)	S
4.	W08IZZ-SM8031G	Web scraping and analysis **GK**	2		1			K2_IZ_W2 U2,6,7,10,11, K1	45	100	4	4	1,96	lec:T/Z lab:T	Z		DN	P (2)	S
5.	W08IZZ-SM8019W	Prescriptive analytics	2					K2_IZ_W1,4,5 U1,4,5,8-11,26, K1	30	50	2	2	1,28	T/Z	Z		DN		S
6.	W08IZZ-SM8019L	Prescriptive analytics			2			K2_IZ_W1,4,5 U1,4,5,8-11,26, K1	30	75	3	3	1,28	T	Z		DN	P	S
7.	W08IZZ-SM8040S	BI Day					1	K2_IZ_U10,11,26 K2_IZ_K1 K2_IZ_K5 K2_IZ_K6 K2_IZ_K7	15	25	1	1	0,68	T	Z		DN	P	S
		Total	**8**	**0**	**8**	**2**	**1**		**285**	**600**	**24**	**24**	**12,52**						

4.2.4.2 … **block** *(min. ECTS points):*

No.	Subject/		Weekly number of hours		Number of hours	Number of ECTS points	Form[2] of subject/group of classes	Way[3] of crediting	Subject/group of classes

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final classes form (lec, cl, lab, pr, sem)
[MS4]University-wide classes /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

	group of classes code	Name of subject/group of classes (denote group of classes with symbol **GK**)	lec	cl	lab	pr	sem	Learning effect symbol	ZZU	CNPS	Total	DN[5] classes	BU[1] classes			University-wide[4]	Concerning scientific activities[5]	Practical[6]	Type[7]

Altogether for specialization blocks:

Total number of hours					Total number of ZZU hours	Total number of CNPS hours	Total number of ECTS points	Total number of ECTS points for DN classes[5]	Number of ECTS points for BU classes[1]
lec	cl	lab	pr	sem					
8	**0**	**8**	**2**	**1**	**285**	**600**	**24**	**24**	**12,52**

4.3 Training block - concerning principles of training crediting – attachment no. …

Opinion of the Advisory Faculty Council concerning the rules of crediting training block

Name of training			
Number of ECTS points	**Number of ECTS points for BU[1] classes**	**Training crediting mode**	**Code**
Training duration	**Training objective**		

4.4 „Diploma dissertation" block (*if it is foreseen at first level studies)*

Type of diploma dissertation	Magister inżynier	
Number of diploma dissertation semesters	**Number of ECTS points**	**Code**
2	**2** **14**	**W08IZZ-SM8032S Diploma seminar** **W08IZZ-SM8034D Diploma Thesis**
Character of diploma dissertation		

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final classes form (lec, cl, lab, pr, sem)
[MS4]University-wide classes /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

Literature survey, project, computer program, etc.	
Number of BU[1] ECTS points	**4,16**
Number of ECTS points DN[5]	**16**

5. Ways of verifying assumed learning outcomes

Type of classes	Ways of verifying assumed learning outcomes
lecture	Examination or colloquium or other form indicated in the classes charter
classses	Colloquium (knowledge test or open questions); solving tasks; literature and case studies, diagnostic or project reports - empirical research in real organizations, opinions of representatives of these organizations; oral presentations with the use of modern means of communication; other form indicated in the classes charter
laboratory	Report on tasks performed, knowledge test; other form indicated in the classes charter
project	Written report documenting the diagnostic-project solution, presentation of the project and its defense; other form indicated in the classes charter
seminar	Selection - formulation of the problem - topic; activity in discussion, written elaboration in the form of a scientific paper, essay, "mini" monograph; oral presentations using modern means of communication; other form indicated in the classes charter
internship	not applicable

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final classes form (lec, cl, lab, pr, sem)
[MS4]University-wide classes /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

6. Range of diploma examination

Creative and design thinking workshop

1. Real-world applications of design thinking

1.1. Give and describe two examples of products developed using the design thinking process

2. Creative thinking techniques

2.1. Give and describe two techniques of creative thinking with examples of their application from real-world businesses.

Physics of complex systems

3. Models of complex systems

3.1. Give one example of a model of a complex system and describe its applications.

4. Complex Networks

4.1 What are the three main models of complex networks? Compare two of them, selected by you.

Business simulations

5. The concept of simulation. The cycle of simulation study

5.1 What is simulation and what are the goals of a simulation? List and briefly discuss the basic steps in a simulation study.

6. Main simulation methods used in management

6.1 Name main simulation methods used to support decision making in management and characterize one of them. Give examples of applications.

Descriptive analytics

7. Linear relationship between variables

7.1 What is a linear regression and how can you estimate it?

8. Nonlinear relationship between variables

8.1 Provide and describe an example of a nonlinear model which can be used to describe a relationship between variables. How can you estimate it?

Business intelligence workplace

9. Descriptive analytics - data visualization tools

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final classes form (lec, cl, lab, pr, sem)
[MS4]University-wide classes /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

9.1 What tools can be used (in your preferred programming language) to visualize categorical, discrete and continuous data. Provide examples and elaborate on the pros and cons.

10. Predictive analytics tools and models

10.1 Describe a sample forecasting problem. What type of methods (algorithms, models) and what software would you use to compute the forecasts? Elaborate on the pros and cons of your choice.

Contemporary economics

11. Phases of the business cycle

11.1 List and characterize the phases of the business cycle (4 phases).

12. Market structures

12.1 Describe the least competitive market structure. Indicate its advantages and disadvantages.

Contemporary management

13. New business models and organizational designs

13.1 Describe a virtual organization. Give an example.

14. Leadership and decision making

14.1 What are the differences between leadership and management?

Digital marketing and social media

15. Search Engine Optimization (SEO) techniques

15.1 Describe at least 5 things that are crucial for SEO techniques.

16. Social media marketing content

16.1 Describe the underlying factors that you would consider before designing content for social media marketing.

17. Social media marketing, branding and Public Relations (PR)

17.1 Describe the differences among the objectives of marketing, branding, and PR through Social Media.

Game and decisions in management

18. Risk and uncertainty modeling in optimization problems

18.1 What are risk measures? Give examples of risk measures with their interpretations.

19. Non-cooperative games

19.1 Describe the concept of equilibrium in non-cooperative games.

20. Cooperative games

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final classes form (lec, cl, lab, pr, sem)
[MS4]University-wide classes /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

20.1 Describe solution concepts of cooperative games.

Predictive analytics

21. Regression vs neural networks

21.1 Describe the similarities and differences between regression and neural network models (linearity, training, stability of forecasts, computational time).

22. Point and probabilistic forecasts

22.1 Describe the concept of quantile regression and quantile regression averaging (QRA).

Visual analytics

23. Application of statistical methods in the visualization and analysis of business data.

23.1 Give examples of statistical methods used in data visualization. Describe the concept of one of them.

24 Application of cluster analysis and decision trees algorithms in visualization to support managerial decisions.

24.1 Give examples of cluster analysis algorithms that are used in data visualization and analysis. Describe the concept of one of them.

Web scraping and analysis

25 Methods of web scraping

25.1 What is HTML parsing and what tools will you use in this regard?

25.2 Explain what is data extraction via API? Point out its pros and cons.

Project management

26 Time management of project implementation

26.1 Discuss the Earned Value Method (EVM) for project control.

27 Project stakeholders management

27.1 Discuss at least three ways to classify project stakeholders and at least three types of project stakeholder management activities.

28 Project metrics

28.1 Assuming the definition of project success based on the value provided to stakeholders, present the principles of selecting metrics for a project.

Cloud computing services

29 Cloud services for business - applications, advantages, disadvantages, and security

29.1 What are the features and business applications of Microsoft cloud services?

29.2 What are the features and business applications of Google cloud services?

Prescriptive analytics

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes

[2]Traditional – enter T, remote – enter Z

[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final classes form (lec, cl, lab, pr, sem)

[MS4]University-wide classes /group of classes – enter O

[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned

[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes

[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

30 Decision making: methods to evaluate alternatives

30.1 Describe the differences among the main Multi-Criteria Decision Making methods.

31 Decision making: efficiency assessment

31.1 Describe three scalarizing functions that can be used in Multi-objective Mathematical Programming.

32 Decision making: building composite indicators

32.1 Describe the methods that can be used to build composite indices.

Business module

33 The role of planning in an organization

33.1 Explain why proper planning in an organization is crucial for its success.

34 Sustainable development of an organization - methods, values

34.1 How to develop a sustainable system for an organization?

Social competences module

Business psychology

35. Psychology of leadership

35.1 What factors determine a successful relationship between the leader and employees?

36. Psychology at work

36.1. Provide three main sources of occupational stress along with an argument why you chose these sources of stress.

Leading teams and work groups

37. Emergence, development, and leadership of teams

37.1. Briefly present team processes of the 2 most innovative teams of the world.

38. Managing team diversity

38.1 What are the main obstacles to communicate effectively in culturally diverse teams?

Ethics module

39. Ethical and philosophical aspects of management

39.1 What ethical issues are related to management, especially in the context of technology use and AI development?

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes

[2]Traditional – enter T, remote – enter Z

[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final classes form (lec, cl, lab, pr, sem)

[MS4]University-wide classes /group of classes – enter O

[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned

[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes

[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

7. Requirements concerning deadlines for crediting classes/groups of classes for all classes in particular blocks

No.	*Subject / group of classes code*	*Name of subject / group of classes*	*Crediting by deadline of... (number of semester)*

8. Plan of studies (attachment no. 3)

Approved by faculty student government legislative body:

....
Date name and surname, signature of student representative

....
Date Dean's signature

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final classes form (lec, cl, lab, pr, sem)
[MS4]University-wide classes /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

Zał. nr 4 do ZW 78/2023
Attachment no. 3. to the Program of Studies

PLAN OF STUDIES

FACULTY: Faculty of Management

MAIN FIELD OF STUDY: Business Engineering

EDUCATION LEVEL: second-level studies

FORM OF STUDIES: full-time studies

PROFILE: general academic

SPECIALIZATION: Business Intelligence

LANGUAGE OF STUDY: English

In effect since educational cycle 2023/2024

Plan of studies structure (optionally)

1) in ECTS point layout

25				25
24	Foreign language (B2+) (01000)	Diploma seminar (00001)		24
23	Physics of complex systems (10100)	Games and decisions in management (20200)		23
22				22
21	Descriptive analytics (20200)			21
20				20
19		Digital marketing and social media (10210)		19
18				18
17	Business simulations (10210)		Research workshop (00001)	17
16			Ethics module (10001)	16
15		Project management (10210)		15
14			Foreign language (A1 or A2) (03000)	14
13	Creative and design thinking workshop (00012)			13
12				12
11		BI Day (00001)	Diploma thesis (00010)	11
10	Contemporary management (20002)	Visual analytics (10110)	Business module (10010)	10
9				9
8			Social competences module (00002)	8
7		Web scrapping and data (20100)		7
6	Contemporary economics (10010)		Cloud computing serices (00101)	6
5				5
4	Business intelligence workplace (10210)	Predictive analytics (20200)	Prescriptive analytics (20200)	4
3				3
2				2
1				1

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final subject form (lec, cl, lab, pr, sem)
[4]University-wide subject /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

2) in hourly layout

25				25
24	Foreign language (B2+) (1)	Diploma seminar (2)		24
23	Physics of complex systems (3)	Games and decisions in management (4)		23
22				22
21	Descriptive analytics (6)			21
20				20
19		Digital marketing and social media (4)		19
18				18
17	Business simulations (6)		Research workshop (1)	17
16			Ethics module (2)	16
15		Project management (6)		15
14			Foreign language (A1 or A2) (2)	14
13	Creative and design thinking workshop (3)			13
12				12
11		BI Day (1)	Diploma thesis (14)	11
10	Contemporary management (4)	Visual analytics (3)	Business module (2)	10
9				9
8			Social competences module (2)	8
7		Web scrapping and data (4)		7
6	Contemporary economics (2)		Cloud computing serices (2)	6
5				5
4	Business intelligence workplace (5)	Predictive analytics (6)	Prescriptive analytics (5)	4
3				3
2				2
1				1

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final subject form (lec, cl, lab, pr, sem)
[4]University-wide subject /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

1. Set of obligatory and optional classes and groups of classes in semestral arrangement

Semester 1

Obligatory classes / groups of classes Number of ECTS points 24

No.	Subject/ group of classes code	Name of subject/group of classes (denote group of classes with symbol **GK**)	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form[2] of subject/group of classes	Way[3] of crediting	Subject/group of classes			
			lec	cl	lab	pr	sem		ZZU	CNPS	Total	DN[5] classes	BU[1] classes			University-wide[4]	Concerning scientific activities[5]	Practical[6]	Type[7]
1.	W08IZZ-SM8025G	Creative and design thinking workshop **GK**				1	2	K2_IZ_W9 U10,11,18,22,23 K1-7	45	75	3	3	1,96	T	Z		DN	P	K
2.	W08IZZ-SM8027G	Physics of complex systems **GK**	1		1			K2_IZ_W11 U10,11,20,21 K1	30	75	3	3	1,36	lec:T/Z lab:T	Z		DN	P (2)	PD
3.	W08IZZ-SM8035G	Business simulations **GK**	1		2			K2_IZ_W1 U1,4,5,10,11, K1	45	100	4	4	1,96	lec:T/Z lab:T	Z		DN	P (3)	K
4.	W08IZZ-SM8035P	Business simulations				1		K2_IZ_W1 U1,4,5,10,11, K1	15	50	2	2	0,68	T	Z		DN	P	K
5.	W08IZZ-SM8028W	Descriptive analytics	2					K2_IZ_W2,4,5 U2,8-11, K1	30	100	4	4	1,36	T/Z	E		DN		PD
6.	W08IZZ-SM8028L	Descriptive analytics			2			K2_IZ_W2,4,5 U2,8-11, K1	30	50	2	2	1,28	T	Z		DN	P	PD
7.	W08IZZ-SM8036G	Contemporary economics **GK**	1			1		K2_IZ_W6,7,9,13,14,U10,11,15, 16,18,24,25, K1	30	50	2	2	1,36	lec:T/Z lab:T	Z		DN	P (1)	K
8.	W08IZZ-SM8026W	Contemporary management	2					K2_IZ_W6,7,9,13,14, U10,11,15-18,24,25, K1	30	50	2	2	1,28	T/Z	Z		DN		K

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final subject form (lec, cl, lab, pr, sem)
[4]University-wide subject /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

9	W08IZZ-SM8026S	Contemporary management					2	K2_IZ_W6,7,9,13,14, U10,11,15-18,24,25, K1	30	50	2	2	1,28	T	Z		DN	P	K
		Total	**7**	**0**	**5**	**3**	**4**		**285**	**600**	**24**	**24**	**12,52**						

Optional classes / groups of classes (minimum 60 hours in semester, 6 ECTS points)

No.	Subject/ group of classes code	Name of subject/group of classes (denote group of classes with symbol **GK**)	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form[2] of subject/group of classes	Way[3] of crediting	Subject/group of classes			
			lec	cl	lab	pr	sem		ZZU	CNPS	Total	DN[5] classes	BU[1] classes			University-wide[4]	Concerning scientific activities[5]	Practical[6]	Type[7]
1.	W08IZZ-SM8029G	Business intelligence workplace **GK**	1		2	1		K2_IZ_W1-3, 5 K2_IZ_U3,9-11 K2_IZ_K1	60	125	5	5	2,64	lec:T/Z lab,pr:T	Z		DN	P (4)	S
2.	JZL	Foreign language (B2+)		1				K2_IZ_U10-14 K2_IZ_K1	15	30	1		0,5	T	Z	O		P	KO
		Total	**1**	**1**	**2**	**1**	**0**		**75**	**155**	**6**	**5**	**3,14**						

Altogether in semester

Total number of hours					Total number of ZZU hours	Total number of CNPS hours	Total number of ECTS points	Total number of ECTS points for DN classes[5]	Number of ECTS points for BU classes[1]
lec	cl	lab	pr	sem					
8	**1**	**7**	**4**	**4**	**360**	**755**	**30**	**29**	**15,66**

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final subject form (lec, cl, lab, pr, sem)
[4]University-wide subject /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

Semester 2

Obligatory classes / groups of classes Number of ECTS points 14

No.	Subject/ group of classes code	Name of subject/group of classes (denote group of classes with symbol **GK**)	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form[2] of subject/group of classes	Way[3] of crediting	Subject/group of classes			
			lec	cl	lab	pr	sem		ZZU	CNPS	Total	DN[5] classes	BU[1] classes			University-wide[4]	Concerning scientific activities[5]	Practical[6]	Type[7]
1.	W08IZZ-SM8009G	Digital marketing and social media **GK**	1		2	1		K2_IZ_W7,9 U10,11,15, K1	60	100	4	4	2,64	lec:T/Z lab:T	Z		DN	P (3)	K
2.	W08IZZ-SM8012W	Games and decisions in management	2					K2_IZ_W1,4,5,9,10 U1,5,8-11,26, K1	30	50	2	2	1,28	T/Z	Z		DN		K
3.	W08IZZ-SM8012L	Games and decisions in management			2			K2_IZ_W1,4,5,9,10 U1,5,8-11,26, K1	30	50	2	2	1,28	T	Z		DN	P	K
4.	W08IZZ-SM8014W	Project management	1					K2_IZ_W,8-10,15,16 U10, 11, 17, 19, 22, 27, K1	15	50	2	2	0,76	T/Z	E		DN		K
5.	W08IZZ-SM8014L	Project management			2			K2_IZ_W,8-10,15,16 U10, 11, 17, 19, 22, 27, K1	30	50	2	2	1,28	T	Z		DN	P	K
6.	W08IZZ-SM8014P	Project management				1		K2_IZ_W,8-10,15,16 U10, 11, 17, 19, 22, 27, K1	15	50	2	2	0,68	T	Z		DN	P	K
		Total	**4**	**0**	**6**	**2**	**0**		**180**	**350**	**14**	**14**	**7,92**						

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final subject form (lec, cl, lab, pr, sem)
[4]University-wide subject /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

Optional classes / groups of classes (minimum 180 hours in semester, 16 ECTS points)

No.	Subject/ group of classes code	Name of subject/group of classes (denote group of classes with symbol **GK**)	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form[2] of subject/group of classes	Way[3] of crediting	Subject/group of classes			
			lec	cl	lab	pr	sem		ZZU	CNPS	Total	DN[5] classes	BU[1] classes			University-wide[4]	Concerning scientific activities[5]	Practical[6]	Type[7]
1.	W08IZZ-SM8013G	Predictive analytics **GK**	2		2			K2_IZ_W1,4,5 U1,5,8-11,26,K1	60	150	6	6	2,64	lec:T/Z lab:T	E (lec)		DN	P (3)	S
2.	W08IZZ-SM8030G	Visual analytics **GK**	1		1	1		K2_IZ_W1-4 U1,2,3,9-11, K1	45	75	3	3	2,04	lec:T/Z lab:T	Z		DN	P (2)	S
3.	W08IZZ-SM8031G	Web scraping and analysis **GK**	2		1			K2_IZ_W2 U2,6,7,10,11, K1	45	100	4	4	1,96	lec:T/Z lab:T	Z		DN	P (2)	S
4.	W08IZZ-SM8040S	BI Day					1	K2_IZ_U10,11, 26 K2_IZ_K1 K2_IZ_K5 K2_IZ_K6 K2_IZ_K7	15	25	1	1	0,68	T	Z		DN	P	S
5.	W08IZZ-SM8032S	Diploma seminar					1	K2_IZ_U10,11, 26 K2_IZ_K1,5,6,7	15	50	2	2	0,68	T	Z		DN	P	K
		Total	**5**	**0**	**4**	**1**	**2**		**180**	**400**	**16**	**16**	**8**						

Altogether in semester

Total number of hours					Total number of ZZU hours	Total number of CNPS hours	Total number of ECTS points	Total number of ECTS points for DN classes[5]	Number of ECTS points for BU classes[1]
lec	cl	lab	pr	sem					
9	**0**	**10**	**3**	**2**	**360**	**750**	**30**	**30**	**15,92**

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final subject form (lec, cl, lab, pr, sem)
[4]University-wide subject /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

Semester 3

Obligatory classes / groups of classes Number of ECTS points 3

No.	Subject/ group of classes code	Name of subject/group of classes (denote group of classes with symbol **GK**)	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form[2] of subject/group of classes	Way[3] of crediting	Subject/group of classes			
			lec	cl	lab	pr	sem		ZZU	CNPS	Total	DN[5] classes	BU[1] classes			University-wide[4]	Concerning scientific activities[5]	Practical[6]	Type[7]
1.	W08IZZ-SM8017G	Cloud computing services **GK**			1		1	K2_IZ_W3 U3,6,10,11, K1	30	50	2	2	1,36	T	Z		DN	P	K
2.	W08IZZ-SM8033S	Research workshop					1	K2_IZ_U8,10,11,26, K1,5,6	15	25	1	1	0,68	T	Z		DN	P	K
		Total			**1**		**2**		**45**	**75**	**3**	**3**	**2,04**						

Optional classes / groups of classes (minimum 270 hours in semester, 28 ECTS points)

No.	Subject/ group of classes code	Name of subject/group of classes (denote group of classes with symbol **GK**)	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form[2] of subject/group of classes	Way[3] of crediting	Subject/group of classes			
			lec	cl	lab	pr	sem		ZZU	CNPS	Total	DN[5] classes	BU[1] classes			University-wide[4]	Concerning scientific activities[5]	Practical[6]	Type[7]
1.	W08IZZ-SM8019W	Prescriptive analytics	2					K2_IZ_W1,4,5 U1,4,5,8-11,26, K1	30	50	2	2	1,28	T/Z	Z		DN		S
2.	W08IZZ-SM8019L	Prescriptive analytics			2			K2_IZ_W1,4,5 U1,4,5,8-11,26, K1	30	75	3	3	1,28	T	Z		DN	P	S
3.	W08IZZ-SM8034D	Diploma Thesis				1		K2_IZ_U10,11,26 K2_IZ_K1,6,7	12	350	14	14	3,48	T/Z	Z		DN	P	K
4.	JZL	Foreign language (A1 or A2)		3				K2_IZ_U10-14 K2_IZ_K1	45	60	2		1,5	T	Z	O		P	KO
5.	IZZ-SM3BISCM	**Social competences module**					2		30	50	2	2	1,28	T	Z		DN	P	KO

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[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final subject form (lec, cl, lab, pr, sem)
[4]University-wide subject /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

	W08IZZ-SM8023S	Business psychology					2	K2_IZ_W12,16 U7,10,11,22,23, K1-5,7	30	50	2	2	1,28	T	Z		DN	P	KO
	W08IZZ-SM8024S	Leading teams and work groups					2	K2_IZ_W12,16 U7,10,11,22,23 K1-5,7	30	50	2	2	1,28	T	Z		DN	P	KO
6.	IZZ-SM3BIBM	**Business module**	1			1			30	50	2	2	1,36	T	Z		DN	P	KO
	W08IZZ-SM8021G	Business planning **GK**	1					K2_IZ_W6,7,14 U7,10,11,15-17,24,25 K1	30	50	2	2	1,36	T	Z		DN	P	KO
	W08IZZ-SM8020G	Business models in developing environment **GK**	1					K2_IZ_W6,7,14 U10,11,15-18,24,25 K1	30	50	2	2	1,36	T	Z		DN	P	KO
	W08IZZ-SM8022G	Corporate Social Responsibility **GK**	1				1	K2_IZ_W6,7,14 U10,11,15,16,18,24, 25, K1	30	50	2	2	1,36	T	Z		DN	P	KO
7.	IZZ-SM3BIEM	**Ethics module**	1				1		30	50	2		1,36	T	Z			P	KO
	W08IZZ-SM8038	Ethics of new technologies **GK**	1					K2_IZ_K7	30	50	2		1,36	T	Z			P	KO
	W08IZZ-SM8037	Ethic of management and new technologies **GK**	1					K2_IZ_K7	30	50	2		1,36	T	Z			P	KO
	W08IZZ-SM8039	Business ethics **GK**	1					K2_IZ_K7	30	50	2		1,36	T	Z			P	KO
		Total	**4**	**3**	**2**	**2**	**3**		**207**	**685**	**27**	**23**	**11,54**						

Altogether in semester

Total number of hours					Total number of ZZU hours	Total number of CNPS hours	Total number of ECTS points	Total number of ECTS points for DN classes[5]	Number of ECTS points for BU classes[1]
lec	cl	lab	pr	sem					
4	**3**	**3**	**2**	**5**	**252**	**760**	**30**	**26**	**13,58**

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final subject form (lec, cl, lab, pr, sem)
[4]University-wide subject /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

2. Set of examinations in semestral arrangement

Subject / group of classes code	Names of classes / groups of classes ending with examination	Semester
W08IZZ-SM8028W	Descriptive analytics	1
W08IZZ-SM8013G	Predictive analytics **GK**	2
W08IZZ-SM8014W	Project management	2

3. Numbers of allowable deficit of ECTS points after particular semesters

Semester	Allowable deficit of ECTS points after semester
1	8
2	15
3	0

Opinion of student government legislative body

....

Date Name and surname, signature of student representative

....

Date Dean’s signature

[1]BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes
[2]Traditional – enter T, remote – enter Z
[3]Exam – enter E, crediting – enter Z. For the group of classes – after the letter E or Z - enter in brackets the final subject form (lec, cl, lab, pr, sem)
[4]University-wide subject /group of classes – enter O
[5]DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned
[6]Practical subject / group of classes – enter P. For the group of classes – in brackets enter the number of ECTS points assigned to practical classes
[7]KO – general education classes, PD – basic sciences classes, K – main field of study classes, S – specialization classes

SUBJECT CARDS

SPECIALIZATION:
PROJECT MANAGEMENT

Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish: Inżynieria wartości i decyzji finansowych
Name of subject in English: Value and financial decisions engineering
Main field of study (if applicable): Business engineering
Specialization(if applicable): Project management
Level and form of studies: 2nd level / fill-time studies
Kind of subject: obligatory
Subject code W08IZZ-SM0001
Group of courses NO

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	**30**	**30**			
Number of hours of total student workload (CNPS)	**100**	**50**			
Form of crediting	**Exam**	**Credit with grade**			
For group of courses mark final course with (X)					
Number of ECTS points	**4**	**2**			
including number of ECTS points for practical classes (P))		**2**			
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)	**1,36**	**1,28**			

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Basic knowledge of accounting and corporate finance
2. Knowledge and understanding of the content contained in the financial statements

SUBJECT OBJECTIVES

C1 Acquainting the student with the areas of financial decisions influencing the management of the enterprise to build its value
C2 Transfer of knowledge and skills related to the use of quantitative tools and methods of making financial decisions.

SUBJECT EDUCATIONAL EFFECTS

In the field of knowledge:
PEU_W01 They know the areas of financial decisions that shape the value of the enterprise
PEU_W02 They know the methods of business risk measurement and the impact of risk on the cost of capital.
PEU_W03 They know the tools for assessing long-term investments.
PEU_W04 They know the factors influencing the value of the enterprise.
PEU_W05 They know the measures of achieving a strategic goal (value increase) such as: EVA, CFROI, SVA.
PEU_W06 They know the methods of evaluation of the enterprise
PEU_W07 They know the basic tools for measuring and reporting intellectual capital.
In the field of skills:

PEU_U01 They can convert the value of a cash stream in time, determine the future and present value of cash streams
PEU_U02 – They can evaluate financial instruments (shares, bonds)
PEU_U03 – They can evaluate financial and material investments
PEU_U04 They understands the objectives of measuring the value of the company
PEU_U05 They can evaluation of the enterprise with the use of assets approach
PEU_U06 They can develop a financial model and evaluate the company value using income approach, including DCF
In the field of social competences:
PEU_K01 They are aware of the role of enterprise values in economic life
PEU_K02 They are aware of the main factors influencing the value of the enterprise

PROGRAM CONTENT		
Lectures		**no. of hours**
Wy1	Aims of managing finances and value of the enterprise	2
Wy2	Introduction to modeling value of money in time	2
Wy3	Models of the future and present value of money	2
Wy4	The concept of an annuity, future and present value of an annuity	2
Wy5	Sources of financing the company operations	2
Wy6	Cost and risk of financing with equity and external capital	2
Wy7	Model of organization cost of capital evaluation	2
Wy8	Investing- introduction	2
Wy9	Estimating the financial efficiency of investments	2
Wy10	The concept of enterprise value, value drivers	2
Wy11	Methods of valuation - asset and market approach	2
Wy12	DCF method	2
Wy13	Value monitoring and management tools (EVA, CFROI, SVA)	2
Wy14	The concept of intellectual capital	2
Wy15	Tools for the evaluation of intellectual capital	2
	Total	**30**
Laboratory		**no. of hours**
Ćw1	Variable value of money in time, future value, present value	2
Ćw2	Annuity - evaluation in time	2
Ćw3	Credit and cost of foreign capital	2
Ćw4	Cost of equity capital, weighted average cost of capital	2
Ćw5	Application of financial functions in financial management	2
Ćw6	Financial investments, evaluation of stocks and bonds	2
Ćw7	Evaluation of tangible investments	2
Ćw8	Evaluation of intangible investments	2
Ćw9	Company value evaluation - cash flow forecasting	2
Ćw10	Company value evaluation – valuation methods	2
Cw11	EVA, CFROI, SVA, MVA value management tools	2
Cw12	Value management tools	2
Cw13	Evaluation of intellectual capital	2
Cw14	Evaluation of intellectual capital	2
Cw15	Summary and test	1
	Total	**30**

TEACHING TOOLS USED
N1. Lecture N2. Case studies analysis N3. Calculation exercise

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming (during semester), P – concluding (at semester end)	Learning outcomes number	Way of evaluating learning outcomes achievement
P1	PEU_W01 -PEU_W09, PEU_U01 - PEU_U06, PEU_K01, PEU_K02	Lecture: The exam is conducted in the form of a written test
Ćw1		Exercises -with a weight of 80%, the result of the test during which the student solves the problems - with a weight of 20%, activity in training classes

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Dudycz, Tadeusz (2005), Zarządzanie wartością przedsiębiorstwa. Warszawa: Polskie Wydawnictwo Ekonomiczne

[2] WILIMOWSKA Z., WILIMOWSKI M., Sztuka zarządzanie finansami., Bydgoszcz, TNOiK OPO, 2001

[3] Value Based Management : koncepcje, narzędzia, przykłady : praca zbiorowa / pod red. Andrzeja Szablewskiego, Krzysztofa Pniewskiego, Bohdana Bartoszewicza ; [aut. Bohdan Bartoszewicz et al.]., Warszawa : Poltext, 2008

SECONDARY LITERATURE:

[1] JAJUGA T., PLUTA W., Inwestycje. Capital Budgeting, AE, Wrocław 1994.

[2] Pluta W., Strategie inwestowania, Wyd. PLACET, Warszawa, 1995.

[3] Wycena aktywów niematerialnych przedsiębiorstwa / Grzegorz Urbanek., Warszawa : Polskie Wydawnictwo Ekonomiczne, 2008

[4] KSZTAŁTOWANIE struktury kapitału w spółkach akcyjnych / Magdalena Jerzemowska. - Warszawa : Wydaw. Naukowe PWN, 1999

[5] Levy H., Sarnat M., Capital investment and Financial Decisions, Prentice Hall, Hrertforshire, 1994

[6] LUMBY S., Investment Appraisal and Financial Decisions, London, Chapman & Hall, 1996

[7] Cwynar A., Systemy VBM i zysk ekonomiczny : projektowanie, wdrażanie, stosowanie, 2010

[8] Damodaran A., Finanse korporacyjne : teoria i praktyka 2007

[9] Zarządzanie wartością spółki kapitałowej : koncepcje - systemy - narzędzia / Andrzej Cwynar, Wiktor Cwynar, Warszawa : Fundacja Rozwoju Rachunkowości w Polsce, 2002

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Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish Metody wspomagania e-biznesu
Name of subject in English Methods of e-business support
Main field of study (if applicable): Business engineering
Specialization (if applicable): Project management
Profile: academic
Level and form of studies: 2nd level, full-time studies
Kind of subject: obligatory
Subject code W08IZZ-SM0002
Group of courses NO

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	**15**			**15**	
Number of hours of total student workload (CNPS)	**25**			**50**	
Form of crediting	**crediting with grade**			**crediting with grade**	
For group of courses mark final course with (X)					
Number of ECTS points	**1**			**2**	
including number of ECTS points for practical (P) classes				**2**	
including number of ECTS points for direct teacher-student contact (BK) classes	**0,68**			**0,68**	

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Basic knowledge about computer systems.

SUBJECT OBJECTIVES

C1 Familiarizing students with advanced methods of Internet use in enterprise management.
C2 Presenting important (from a business perspective) models of e-business.
C3 Preparing for starting own businesses in the Internet.

SUBJECT LEARNING OUTCOMES

relating to knowledge:
PEU_W01 Student knows main models and processes of enterprise management using the Internet
PEU_W02 Student has a structured knowledge about the e-business (the fundaments of technical and economic infrastructure).
relating to skills:
PEU_U01 Student can plan own business in the Internet
relating to social competences:

PEU_K01 Student understands the importance of the electronic solutions in the business.

PROGRAM CONTENT		
Lectures		**Number of hours**
Lec 1	Introduction to the subject of e-business. History of the commercial development of the Internet. Classification of solutions in e-business	1
Lec 2	Online stores - construction and main principles of implementation	2
Lec 3	Online stores - functionalities and technologies	2
Lec 4	Search Engine Optimization - methods	2
Lec 5	Google Ads, Smart Ads, Google Merchant	2
Lec 6	Logistics management in the online store. Dropshipping, last mile problem	2
Lec 7	Commercial websites - a case studies	2
Lec 8	Test	2
	Total hours	15

Project		**Number of hours**
Proj 1	Presentation of the subject and rules of crediting	1
Proj 2	The idea of operating	2
Proj 3	Market analysis (competitors)	2
Proj 4	Logistic aspect	2
Proj 5	Financial and legal aspects	2
Proj 6	Marketing aspect	2
Proj 7	Technological aspect – tools	2
Proj 8	Presentation of the results	2
	Total hours	15

TEACHING TOOLS USED
N1. Lecture N2. Multimedia presentation N3. Internet databases N4. Case studies

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming (during semester), P – concluding (at semester end)	Learning outcomes number	Way of evaluating learning outcomes achievement

F1	PEU_W01 –W02 PEU_K01	Test
F2	PEU_W01 –W02 PEU_U01 PEU_K01	Implementation of the commercial web site Presentation of the results
F3	PEU_W01 –W02 PEU_U01 PEU_K01	Report concerning commercial web site implementation including the description of marketing tools.
P(for lecture)= F1 P(for project) = 0.6*F2+0.4*F3		

PRIMARY AND SECONDARY LITERATURE

primary literature:

[1] Galloway, S. (2018), Wielka czwórka. Ukryte DNA: Amazon, Apple, Facebook i Google, Wydawnictwo Rebis.

[2] Chaffey D. (2020), Digital Business i E-Commerce Management. Wydawnictwo Naukowe PWN.

[3] Chodak, G. (2014), Wybrane zagadnienia logistyki w sklepach internetowych:-modele, badania rynku. Oficyna Wydawnicza Politechniki Wrocławskiej.

secondary literature:

[1] Chodak, G., Chawla, Y., Dzidowski, A., & Ludwikowska, K. (2019). The effectiveness of marketing communication in social media. In ECSM 2019 6th European Conference on Social Media (p. 73). Academic Conferences and Publishing Limited Sonning Common, UK.

[2] Hanson, W. A., & Kalyanam, K. (2020). Internet marketing and e-commerce. Thomson/South-Western.

[3] Skorupska J., A. (2017), E-commerce. Wydawnictwo Naukowe PWN.

[4] Bonek, T., Smaga, M. (2012), Biznes w internecie: Praktyczny poradnik o marketingu, sprzedaży, public relations on-line i promocji w mediach społecznościowych. Wolters Kluwer, Warszawa.

[5] Feldy, M. (2012), Sklepy internetowe. Oficyna Wolters Kluwer, Warszawa.

[6] Tokar, T., Jensen, R., & Williams, B. D. (2021). A guide to the seen costs and unseen benefits of e-commerce. Business Horizons, 64(3), 323-332.

[7] Bhattacharyya, S., & Bose, I. (2020). S-commerce: Influence of Facebook likes on purchases and recommendations on a linked e-commerce site. Decision Support Systems, 138, 113383.

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Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish Programowanie w analizie danych
Name of subject in English Programming in the data analysis
Main field of study (if applicable): Business Engineering
Specialization (if applicable): Project management
Profile: academic
Level and form of studies: 2nd level full-time
Kind of subject: obligatory
Subject code W08IZZ-SM0003
Group of courses YES

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	**15**		**30**		
Number of hours of total student workload (CNPS)			**75**		
Form of crediting			**crediting with grade**		
For group of courses mark (X) final course			**x**		
Number of ECTS points			**3**		
including number of ECTS points for practical classes (P)			**2**		
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)			**1,96**		

*delete as not necessary

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Basic knowledge of Python
2. Knowledge of statistics, especially exploratory data analysis

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SUBJECT OBJECTIVES

C1 Introducing students to the Python programming language in relation to data analysis

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:
PEU_W01: Knows the syntax and basic concepts of the Python programming language
PEU_W02: Knows the capabilities of selected Python libraries for data analysis

relating to skills:
PEU_U01: Can write a program in Python
PEU_U02: Can use Python to implement a project in the field of data science

PROGRAM CONTENT		
Lectures		**Number of hours**
Wy1	The role of programming in data analysis. Python work environment tools	1
Wy2	Data types in Python; loops and lists, dictionaries, and sets comprehensions; control statements, exception handling: types of exceptions and their handling	2
Wy3	Functions, lambda expressions, functional programming	2
Wy4	Introduction to data analysis using libraries: `NumPy`, `SciPy`, and `Pandas`	2
Wy5	Cleaning, transforming, and analyzing data	2
Wy6	Data visualization using libraries: `matplotlib` and `seaborn`	2
Wy7	Selected machine learning models in the library: `scikit-learn`	2
Wy8	Sample data analysis project	2
	Total hours	**15**

Laboratory		Number of hours
La1	Course assessment criteria. Rules and safety procedure for laboratory. Python interpreter and tools used during work.	2
Lab2-4	Processing built-in Python object types	6
Lab5	Quiz	2
Lab6	Reading and writing data. Basic operations on data frames	2
Lab7-9	Exploratory data analysis for business problem 1	6
Lab10-12	Exploratory data analysis for business problem 2	6
Lab13	Machine learning models for business problem 1	2
Lab14	Machine learning models for business problem 2	2
Lab15	Report discussion	2
	Total hours	**30**

TEACHING TOOLS USED
N1. Multimedia presentation. N2. Solving problems, case study N3. Python, Python scripts

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
F1	PEU_W01 PEU_U01	Written test
F2	PEU_W01 PEU_W02 PEU_U02	Report
P = 0.2×F1 + 0.8×F2		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Mark Lutz, *Python. Wprowadzenie*, wydanie V, Helion, 2020.
[2] McKinney W., *Python for Data Analysis: Data Wrangling with pandas, NumPy, and Jupyter*, wydanie III, O'Reilly Media, 2023.

SECONDARY LITERATURE:

[1] https://docs.python.org/3/tutorial/index.html
[2] https://numpy.org/doc/
[3] https://pandas.pydata.org/docs/
[4] https://matplotlib.org/stable/contents.html
[5] https://seaborn.pydata.org/
[6] https://scikit-learn.org/stable/

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Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish: Psychologia Biznesu
Name of subject in English: Business Psychology
Main field of study (if applicable): Business Engineering
Specialization (if applicable): Project Management
Profile: academic
Level and form of studies: 2nd level, full-time
Kind of subject: obligatory
Subject code W08IZZ-SM0004
Group of courses NO

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	**15**				**15**
Number of hours of total student workload (CNPS)	**25**				**25**
Form of crediting	**crediting with grade**				**crediting with grade**
For group of courses mark (X) final course					
Number of ECTS points	**1**				**1**
including number of ECTS points for practical classes (P)					**1**
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)	**0,68**				**0,68**

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Basic knowledge of general psychology, i.e. mechanisms that guide thinking, decision-making and motivated human behavior
2. Ability to speak and write concisely.
3. Knowledge of presentation techniques.
4. Ability to work in groups.

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SUBJECT OBJECTIVES

C1 Acquainting students with the psychological basis of diagnosing behavior and different phenomenon in the organization
C2 Acquainting students with career patterns and individual development
C3 Developing skills associated with researching theoretical and practical data, understanding results of scientific research, communicating effectively outcomes of scientific research

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:
PEU_W01 Understands the role of the interaction of individuals and groups in a specific organizational context.
relating to skills:
PEU_U01 Identifies psychological factors contributing to employees work motivation, satisfaction, and engagement.

PEU_U02 Identifies psychological factors contributing to effective people management in project tasks and successful organizational leadership.

relating to social competences:

PEU_K01 Communicates effectively and empathetically with others, while respecting different perspectives and worldviews

PEU_K02 Can convey his own views and stand up for them. Is prepared to persuade and negotiate for the sake of achieving common goals.

PROGRAMME CONTENT

Lecture		Number of hours
Le 1	The importance of psychology in business. Introduction to the issues.	1
Le 2	Psychological determinants of human functioning in an organization: personality, temperament, cognitive abilities	2
Le 3	Mechanisms of work motivation	2
Le 4	Psychological aspects of organizational commitment, employee engagement, and job satisfaction	2
Le 5	Psychosocial resources and job demands	2
Le 6	Employees' dysfunctional characteristics and behavior	2
Le 7	Leadership as an employee support system	2
Le 8	Values and ethical behavior/final test	2
	Total hours	**15**
Seminar		**Number of hours**
Se 1	Analysis of the organization as an interactive system of mutual interactions between employees and the organization - a psychological perspective	1
Se 2	Individual differences of employees and their fit to the profession	2
Se 3	Individual differences between employees in terms of resources and ability to meet job demands: cognitive demands, emotional demands, quantitative demands, and work pace	2
Se 4	Psychology of decision-making and moral judgment: cases of bankruptcy of "big business"	2
Se 5	Individual behavior in project teams; innovative teams of the world	2
Se 6	Role clarity and autonomy as basis of work engagement	2
Se 7	The emergence of leadership: psychological and organizational determinants of differences between leaders and managers. A biographical study of great world leaders.	2
Se 8	Psychological differences between employees of business organizations and non-governmental organizations	2
	Total hours	**15**

TEACHING TOOLS USED

N1. Multimedia presentation: interactive lecture
N2. Analyzing scientific publications
N3. Case studies
N4. In-class video material/discussion
N5. Multimedia presentation

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
F1 test	PEU_W01	Test crediting with grade

F2 assignments/tasks	PEU_U01, PEU_U02	Assessment of the formal value and practical significance of the tasks performed
F3 (in-class activity)	PEU_K01, PEU_K02	Appraisal of in-class activity and group work
P (lecture) F1 P (seminar) 0,7*F2 + 0,3*F3		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[[1] Fortuna, P., Rożnowski, B. (2020). *Psychologia Biznesu* (eBook). Warszawa: PWN

[2] Bajcar, B. (2019). Jasne i ciemne strony osobowości pracownika w organizacji. *Zarządzanie Zasobami Ludzkimi,* 1,126,73-84.

SECONDARY LITERATURE:

[1] McKenna, E. (2020; 6th ed.). *Business psychology and organizational behaviour.* Routledge: ISBN-13: 978-1138182646

[2] Johnson, R.D., ed. (2021). *Handbook of research on multidisciplinary perspectives on managerial and leadership psychology (Advances in logistics, operations, and management science).* Business Science Reference: ISBN-13: 978-1799838111

[3] Sawhney, G., Michel, J.S. (2021). Challenge and Hindrance Stressors and Work Outcomes: the moderating Role of Day-Level Affect. *Journal of Business and Psychology,* 36,4.

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Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish: Symulacje w biznesie
Name of subject in English: Business simulation
Main field of study (if applicable): Business Engineering
Specialization (if applicable): Project management
Profile: academic
Level and form of studies: 2nd level full-time
Kind of subject: obligatory
Subject code W08IZZ-SM0005
Group of courses YES

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	**15**		**30**		
Number of hours of total student workload (CNPS)	**25**		**75**		
Form of crediting			**Crediting with a grade**		
For group of courses mark final course with (X)			**X**		
Number of ECTS points			**4**		
including number of ECTS points for practical classes (P)			**3**		
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)			**1,96**		

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Ability to model in an Excel spreadsheet
2. Basic knowledge of probability theory and mathematical statistics
3. Knowledge of basic concepts of simulation modeling

SUBJECT OBJECTIVES

C1 - To familiarize students with the principles of building simulation models, in particular Monte Carlo, discrete event and agent-based models
C2– Developing skills in using simulation models to describe the current state and forecast future states of organizations
C3 - To develop skills in solving complex management decision problems using computer simulation experiments

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:
PEU_W01. Knows advanced methods and computer simulation tools for identifying and modeling complex management decision-making processes. Has in-depth knowledge of

selected simulation methods supporting decision making in a variable or uncertain environment. relating to skills: PEU_U01. Can choose the right simulation method and build a simulation model. Can plan and carry out computer simulation experiments. Is able to use simulation models in solving complex management decision problems relating to social competences: PEU_K01 Understand the essence of business ethics PEU_K02 Is able to cooperate and work in groups and teams

PROGRAM CONTENT		
Lectures		**Number of hours**
Lec 1	Presentation of the requirements and grading.	1
Lec 2	Introduction to simulation modeling. Definitions and concepts. Review of management simulation methods. The framework of the simulation study.	2
Lec 3	Monte Carlo method. Sampling methods.	2
Lec 4	Discrete event simulation – process modeling – part 1	2
Lec 5	Discrete event simulation – process modeling- part 2	2
Lec 6	Application of agent-based modeling in social science	2
Lec 7	Agent-based modeling – part 1	2
Lec 8	Agent-based modeling – part 2	2
	Total hours	**15**

Laboratory		**Number of hours**
Lab 1	Requirements and grading. Objectives of the subject. Simple Monte Carlo (MC) simulations	2
Lab 2	MC model: discrete and continuous distributions. Case no 1	2
Lab 3	MC Model: project management. Case no 2	2
Lab 4	Discrete event simulation. Introduction to Arena	2
Lab 5	Discrete event simulation. Transportation model part 1	2
Lab 6	Discrete event simulation. Transportation model part 2	2
Lab 7	DES model defense and presentation	2
Lab 8	Introduction to NetLogo - commands and procedures	2
Lab 9	Analysis of examples in the NetLogo Models Library – part 1	2

Lab 10	Usage of behavior space	2
Lab 11	Building an own ABM – part 1	2
Lab 12	Building an own ABM – part 2	2
Lab 13	Building an own ABM – part 3	2
Lab 14	ABM presentation and evaluation – part 1	2
Lab15	ABM presentation and evaluation – part 2	2
	Total hours	30

TEACHING TOOLS USED
N1. Multimedia presentation N2. NetLogo, Arena, Vensim N3. Microsoft Excel spreadsheet

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming (during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
F1	PEU_U01 PEU_K01 PEU_W01	Task 1 (Models MC)
F2	PEU_U01 PEU_K01 PEU_K02 PEU_W01	Task 2 (Models DES)
F3	PEU_W01 PEU_U01 PEU_K01 PEU_K02	Task 3 (ABM models)
F4	PEU_U01 PEU_K01 PEU_K02	Task 4 (ABM model)
F5	PEU_W01	Mini tests
P(L) = 0,5*(F1+F2)/2 + 0,5*(F3+F4)/2 P(W) = F5 P(GK)=0,8*P(L) + 0,2*P(W)		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

1. **Mielczarek B.,** *Modelowanie symulacyjne w zarządzaniu. Symulacja dyskre*tna. Oficyna Wydawnicza PWr Wrocław 2009
2. **Winston L.W**., Microsoft Excel 2020. Analiza i modelowanie danych biznesowych, APN Promise, Warszawa 2019
3. Wilensky U., Rand W. Natural, Social, and Engineered Complex Systems with NetLogo, The MIT Press, 2015

SECONDARY LITERATURE:

1. Law A., Kelton W.D., *Simulation modeling and analysis*, McGraw Hill Higher Education 2007
2. Hamill, L., Gilbert, N. Agent-Based Modelling in Economics, 2016 John Wiley & Sons, Ltd.

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Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish Twórcze projektowanie
Name of subject in English Creative design
Main field of study (if applicable): Business Engineering
Specialization (if applicable): Project management
Profile: academic
Level and form of studies: 2nd level, full-time
Kind of subject: obligatory
Subject code W08IZZ-SM0006
Group of courses NO

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)					**30**
Number of hours of total student workload (CNPS)					**50**
Form of crediting					crediting with grade
For group of courses mark (X) final course					
Number of ECTS points					**2**
including number of ECTS points for practical classes (P)					**2**
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)					**1,28**

*delete as not necessary

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

none

SUBJECT OBJECTIVES

C1. Gaining knowledge about creativity, innovation, problem solving and new product development.
C2. Developing creativity related skills in problem solving and NPD processes
C2. Developing a broad range of socially engaged and critical thinking skills

SUBJECT LEARNING OUTCOMES

relating to knowledge:
PEU_W01 Ability to define and explain the role of creativity, innovation and related issues in business strategy creation
PEU_W02 Understanding of the methods and techniques used in innovation and creativity management
relating to skills:
PEU_U01 Ability to plan and execute the NPD process in response to market needs
PEU_U02 Ability to use the creative method in business problem solving
relating to social competences:
PEU_K01 Ability to work in group problem solving activities
PEU_K02 Ability to approach human needs in an empathic and engaged manner

PROGRAMME CONTENT

Seminar		Number of hours
Semin 1	Introduction to creativity and innovation	2
Semin 2	Creative processes support methods	2
Semin 3	10 faces of innovation	2
Semin 4	Design Thinking	2
Semin 5-6	Design Thinking: Inspiration	4
Semin 7-8	Design Thinking: Ideation	4
Semin 9-10	Design Thinking: Implementation	4
Semin 11	Inclusive and universal design	2
Semin 12	Sustainable design	2
Semin 13	Critical design	2
Semin 14	Speculative design	2
Semin 15	Closing seminar	2
	Total hours	30

TEACHING TOOLS USED

N1. Project presentation
N2. Case studies
N3. Discussion
N4. Self-study
N5. Prototyping

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
F1	PEU_W01-W02	Self-study assessment
F2	PEU_W01-W02, PEU_ U01-U02	Discussion, Case studies
F3	PEU_U01-U02, PEU_K01-K02	Project presentation, Prototyping
P = 0,2*F1 + 0,3*F2 + 0,5 F3		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Tom Kelley, David Kelley Twórcza Odwaga. Otwórz się na Design Thinking, MT Biznes, 2019
[2] Don Norman, Dizajn na co dzień, Karakter, 2018
[3] Victor Papanek, Dizajn dla realnego świata. Środowisko człowieka i zmiana społeczna, Recto Verso, 2013
[4] Henryk Bieniok, Grażyna Gruszczyńska-Malec, Grażyna Królik, Techniki kreatywnego myślenia, Wydawnictwo Uniwersytetu Ekonomicznego w Katowicach, 2013
[5] Kreowanie zachowań innowacyjnych, przedsiębiorczych i twórczych w edukacji inżyniera / pod red. Jana Skoniecznego, Indygo Zahir Media, 2011

SECONDARY LITERATURE:

[1] Richard Morris, Projektowanie produktu, PWN, 2009
[2] https://designthinking.ideo.com/
[3] https://servicedesigntools.org/
[4] https://www.ideo.com/post/design-thinking-for-educators
[5] https://frsi.org.pl/myslenie-projektowe-w-bibliotekach-lektura-obowiazkowa/
[6] https://udlguidelines.cast.org/
[7] https://inclusivedesignprinciples.org/
[8] https://www.microsoft.com/design/inclusive/

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

Adam Dzidowski, adam.dzidowski@pwr.edu.pl

Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish Usługi chmurowe
Name of subject in English Cloud computing services
Main field of study (if applicable): Business Engineering
Specialization (if applicable): Project Management
Profile: academic
Level and form of studies: 2nd level, full-time
Kind of subject: obligatory
Subject code W08IZZ-SM0007
Group of courses YES

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)			**15**		**15**
Number of hours of total student workload (CNPS)			**50**		**50**
Form of crediting			**crediting with grade**		**crediting with grade**
For group of courses mark (X) final course			**X**		
Number of ECTS points			**4**		
including number of ECTS points for practical classes (P)			**2**		
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)			**1,36**		

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Basic understanding of multi-tier architecture and Internet applications.

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SUBJECT OBJECTIVES

C1 Acquire knowledge of the capabilities and applications of modern cloud technologies in management, supporting the functioning of organizations and in the work of the engineer-manager.
C2 Acquire skills in selecting and configuring cloud services, and deploying selected applications.

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:
PEU_W01 Has knowledge of the operation and functionality of cloud technologies and services.
PEU_W02 Has knowledge of the applications of cloud services in management, supporting the operations of organizations and in the work of engineers/managers.
relating to skills:

PEU_U01 Can acquire the information necessary to identify modern cloud technologies and services, can compare offerings in the vendor market and match them to the organization's needs.
PEU_U02 Can identify features, advantages, disadvantages and applications of existing cloud technologies and can critically evaluate them.
PEU_U03 Can implement selected solutions to support the operations of organizations and the work of engineers/managers.

PROGRAMME CONTENT

Laboratory		Number of hours
Lab 1	Discussing the safety and class regulations as well as the scoring/grading policy.	1
Lab 2	1A. Hosting services: creating an account, overview of applications in the app installer, installing and testing a Content Management System.	2
Lab 3	1B. Overview of the features of a hosting server. File management. Discussing results and crediting tasks 1A and 1B.	2
Lab 4	2A. Hosting services: installing and implementing a selected Internet application.	2
Lab 5	2B: Overview and deployment of selected applications/plugins. Discussing results and crediting tasks 2A and 2B.	2
Lab 6	3A. Cloud services of a leading global provider, such as Microsoft Azure. Deploying selected applications.	2
Lab 7	3B.Deploying virtual machines and working with a remote desktop of a cloud workstation. Discussing results and crediting tasks 3A and 3B.	2
Lab 8	Retake class and extra tasks. Grading.	2
	Total hours	15

Seminar		Number of hours
Semin 1	Introduction to the seminar. Discussing the class rules and the scoring/grading policy. Allocation of topics to be presented.	1
Semin 2	Types of clouds and models of cloud services. The benefits of cloud computing.	2
Semin 3	Basic file storage and synchronization services.	2
Semin 4	Cloud solutions offered by leading global providers such as Microsoft, Amazon, Google, IBM, Oracle.	2
Semin 5	Cloud solutions offered by Polish and EU companies, such as Octawave, Beyond.	2
Semin 6	Applications of the cloud in various areas of business activity.	2
Semin 7	Component selection and migration to the cloud. Reliability, security and legal aspects.	2
Semin 8	Challenges of the future and directions of cloud services development. Summary of the topics discussed throughout the semester.	2

	Total hours	15

TEACHING TOOLS USED
N1. Resources published in the university ePortal course website. N2. Lab assignment lists and seminar topics. N3. Google, Microsoft, Amazon and Oracle cloud web services. N4. Scientific elaboration of topics based on literature analysis. N5. Presentation of issues at the seminar - slideshow or software, and discussion. N6. Group discussion.

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
F1	PEU_W01, PEU_W02	Evaluation of the content and presentation of the seminar essay and participation in the discussion.
F2	PEU_U01, PEU_U02, PEU_U03	Evaluation of the lab assignments and reports.
P = 0,5*F1 + 0,5*F2. Passing scores of both F1 and F2 required.		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Aktualne artykuły, odnośniki i instrukcje na stronie kursu w ePortalu.
[2] Toroman M., Chmura Azure, Helion 2020.
[3] Chatterjee S., Google Cloud Certified Professional Cloud Architect. Wprowadzenie do platformy, Helion 2020.
[4] Wilkins M., Amazon Web Services. Podstawy korzystania z chmury AWS. Helion 2020.

SECONDARY LITERATURE:

[1] Hunter T., Building Google Cloud Platform Solutions: Develop scalable applications from scratch and make them globally available in almost any language, Packt Publishing, 2019.
[2] Toroman M., Azure Networking Cookbook: Practical recipes for secure network infrastructure, global application delivery, and accessible connectivity in Azure, Packt Publishing, 2021.
[3] Wittig A., Wittig M., Amazon Web Services w akcji. Wydanie II. Helion 2020.

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

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Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish Zarządzanie zespołem projektowym
Name of subject in English Project team management
Main field of study (if applicable): Business Engineering
Specialization (if applicable): Project management
Profile: academic
Level and form of studies: 2nd level, full-time
Kind of subject: obligatory
Subject code W08IZZ-SM0009
Group of courses NO

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	**15**				**30**
Number of hours of total student workload (CNPS)	**25**				**50**
Form of crediting	**crediting with grade**				**crediting with grade**
For group of courses mark (X) final course					
Number of ECTS points	**1**				**2**
including number of ECTS points for practical classes (P)					**2**
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)	**0,68**				**1,28**

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

Basic knowledge of project management

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SUBJECT OBJECTIVES

C1: Acquisition of knowledge and skills enabling the development of competences related to the management of a project team

C2: Educating students of advanced cooperation skills within project teams

SUBJECT LEARNING OUTCOMES

In the field of knowledge:

PEU_W01 student has an extended and deepened knowledge of the principles of building and functioning of project teams and the factors influencing their efficiency.

In the field of skills:

PEU_U01 student cooperate with other participants as part of a project team, can initiate activities, communicate, encourage continuous learning, delegate powers, and evaluate work progress

PEU_U02 student is able to use competence profiles and other tools to select a project manager and team members on the basis of rational premises taking into account environmental conditions

In the field of social competences: PEU_K01 student is ready to organize the team's work and seek creative solutions to the problems associated with managing a project team PEU_K02 student is aware of group processes taking place in project teams and the related ethical challenges

PROGRAMME CONTENT		
Lecture		**Number of hours**
Lec 1	Introduction to project management: the type of project and its purpose and the organizational structure of the project team. Team work organization - essence, goals, meaning	2
Lec 2	Pure forms of teamwork - types of teams. task team and project team. Task team in the form of a project - the essence of the project, effectiveness and efficiency of the project team. Contemporary concepts of personnel and project team management	2
Lec 3-4	Building a project team: analysis of the project environment, team size and functions as well as division of roles and tasks in the team, selection and improvement of team members, integration of the project team. Competency model in managing a project team	4
Lec 5-6	Functioning of the project team, work organization: functions, tasks and roles, relationships and communication of team members, decision making, motivating and evaluating team members, communication and sharing knowledge in the team, resolving conflicts in the project team.	4
Lec 7	Manager - team leader: conditions for effective, efficient and efficient management of a project team, management styles and techniques versus the organizational culture of a project team. Project manager versus team leader, manager certification.	2
Lec 8	Summary and assessment - evaluation	1
	Total hours	15

Seminar		**Number of hours**
Semin 1	Introduction- organizational matters.	2
Semin 2	Group dynamics and team building	2
Semin 3-4	Team roles. Adaptation processes of teams and in teams. The rules of social influence and the practice of team activities. Competency profiles of team members and the project manager	4
Semin 5	Adaptation processes of teams and in teams. The rules of social influence and the practice of team activities	2
Semin 6-7	Delegating tasks and planning work in project teams	4
Semin 8-9	Conditions, methods and tools for communication in project teams	4
Semin 10	Teamwork dysfunctions. Team management in a crisis situation	2
Semin 11	Knowledge management in project teams	2
Semin 12	Agile team management	2

Semin 13-14	Project team management case studies	4
Semin 15	Summary	2
	Total hours	30

TEACHING TOOLS USED
N1. Problem lecture with the use of a multimedia presentation N2. Group work N3. Case studies

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
F1	PEU_W01; PEU_U02	Final test
F2	PEU_U01; PEU_U02; PEU_K01; PEU_K02;	Assessment of the preparation of group work
F3	PEU_U02; PEU_K01; PEU_K02	Assessment of activity
F4	PEU_U01; PEU_K01; PEU_K02	Assessment of preparation for discussion
P lecture =F1 P seminar =0,4*F2+0,3*F3+ 0,3*F4		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Belbin M. (2010), Nie tylko zespół, Wyd. Oficyna a Wolters Kluwer Business, Warszawa
[2] Lencioni P. (2016), Pięć dysfunkcji pracy zespołowej, MT Biznes, Warszawa
[3] Żeromski M. (2020), Budowanie zespołu, Wydawnictwo Helion, Gliwice

SECONDARY LITERATURE:

[1] Harvard Business Review (2017), Podręcznik menedżera – 17 najważniejszych umiejętności lidera, Rebis
[2] Paterek P., Kozarkiewicz A. (2020), Zwinne zarządzanie zespołami projektowymi, Wydawnictwo C.H. Beck, Warszawa

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

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Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish Modelowanie ekonometryczne i prognozowanie
Name of subject in English Econometric Modelling and Forecasting
Main field of study (if applicable): Business Engineering
Specialization (if applicable): Project management
Profile: academic
Level and form of studies 2nd level, full-time
Kind of subject: obligatory
Subject code W08IZZ-SM0010
Group of courses NO

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	**30**		**30**		
Number of hours of total student workload (CNPS)	**50**		**75**		
Form of crediting	**crediting with grade**		**crediting with grade**		
For group of courses mark (X) final course					
Number of ECTS points	**2**		**3**		
including number of ECTS points for practical classes (P)			**3**		
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)	**1,28**		**1,28**		

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Programming skills in Matlab/Octave, R, Python, Excel
2. Knowledge of the basics of probability theory and mathematical statistics

SUBJECT OBJECTIVES

C1 Acquiring knowledge in the field of forecasting
C2 Acquiring the ability to apply knowledge in practice to the analysis of social and economic phenomena

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:

PEU_W01 He knows advanced prognostic methods. Has in-depth knowledge of selected linear and non-linear forecasting methods supporting decision making in a changing or uncertain environment.

relating to skills:

PEU_U01 He can choose the right forecasting method and build a forecasting model. Can assess the quality of forecasts. Can use prognostic models to solve complex management decision problems.

PEU_U02 He can choose the right forecasting method and build a forecasting model. Can assess the quality of forecasts. Can use prognostic models to solve complex management decision problems.

relating to social competences:

PEU_K01 He understands the essence of ethics in business

PEU_K02 He understands the essence of ethics in business

PROGRAMME CONTENT		
Lecture		**Number of hours**
Lec 1	Data, time series, transformations and time series decomposition	4
Lec 2	Basics of time series models - white noise, random walk, correlogram, moving average models, model identification	4
Lec 3	Autoregression models, partial correlogram, stationarity, model identification	4
Lec 4	Model parameters estimation - least squares method, maximum likelihood method	4
Lec 5	ARMA and ARIMA models	4
Lec 6	Model verification - residual research, Akaike's information criterion	2
Lec 7	Seasonal models	2
Lec 8	Simple forecasting methods	1
Lec 9	Forecasting based on ARIMA models	2
Lec 10	Exponential smoothing algorithms	1
Lec 11	Test	2
	Total hours	30

Laboratory		**Number of hours**
Lab 1	Data, time series, transformations and time series decomposition	4
Lab 2	Basics of time series models - white noise, random walk, correlogram, moving average models, model identification	4
Lab 3	Autoregression models, partial correlogram, stationarity, model identification	4
Lab 4	Model parameters estimation - least squares method, maximum likelihood method	4
Lab 5	ARMA and ARIMA models	4
Lab 6	Model verification - residual research, Akaike's information criterion	2

Lab 7	Seasonal models	2
Lab 8	Simple forecasting methods	2
Lab 9	Forecasting based on ARIMA models	2
Lab 10	Exponential smoothing algorithms	2
	Total hours	30

TEACHING TOOLS USED
N1. Multimedia presentations N2. Working with a computer - statistical packages / environments (R, Matlab / Octave, Python, Excel)

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
F1	PEU_U01 PEU_K01	Sub-task 1 (reading data, transforming numbers) Mini tests
F2	PEU_U01 PEU_K01	Sub-task 2 (ARMA models) Mini tests
F3	PEU_U01 PEU_K01	Sub-task 3 (seasonal models) Mini tests
F4	PEU_U01 PEU_K01	Sub-task 4 (Forecasting)
F5	PEU_W01	Final test
P(Lab) = 0,5*(F1+F2)/2 + 0,5*(F3+F4)/2 P(Lec) = F5		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Gładysz B., Mercik J., *Modelowanie ekonometryczne. Studium przypadku*. Oficyna Wydawnicza Politechniki Wrocławskiej 2007.

[2] Suchwałko A, Zagdański A, Analiza i prognozowanie szeregów czasowych, PWN, Warszawa 2021.

[3] Mercik J., Szmigiel Cz.: *Ekonometria*. Wrocław : Oficyna Wydaw. PWroc., 2007, 32 s.

SECONDARY LITERATURE:

[1] Cieślak M., (red.) *Prognozowanie gospodarcze. Metody i zastosowania*, Wydawnictwo Naukowe PWN, Warszawa 2002.

[2] Brockwell P.J, Davis R.A, *Introduction to Time Series and forecasting*. Springer New York 1996.
[3] Dougherty Ch., *Introduction to Ekonometrics*, Oxford University Press, Oxford -New York 2002.
[4] Milo W. *Szeregi czasowe*, PWE Warszawa 1990.
[5] Milo W. *Prognozowanie i symulacja*. Wydawnictwo Uniwersytetu Łódzkiego, Łódź 2002.

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

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Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish Pozyskiwanie i analiza danych stron www
Name of subject in English Web scraping and data analysis
Main field of study (if applicable): Business Engineering
Specialization (if applicable): Project Management
Profile: academic
Level and form of studies: 2nd level, full-time
Kind of subject: obligatory
Subject code W08IZZ-SM0011G
Group of courses YES

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	**15**		**15**		
Number of hours of total student workload (CNPS)			**75**		
Form of crediting			**crediting with grade**		
For group of courses mark final course with (X)			**X**		
Number of ECTS points			**3**		
including number of ECTS points for practical (P) classes			**2**		
including number of ECTS points for direct teacher-student contact (BU) classes			**1,36**		

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Basic knowledge and ability to use R program
2. Basic knowledge of HTML and CSS

SUBJECT OBJECTIVES

C1: Technical knowledge necessary to quickly obtain a large amount of data, automate this process.

C1: Mastering the ability to process such data into useful information supporting management processes.

C3: Mastering the ability to use the R program throughout the process: from data acquisition to analysis.

SUBJECT LEARNING OUTCOMES

Relating to knowledge:

PEU_W01: Basic knowledge to obtain and analyze data from websites.

Relating to skills:

PEU_U01: Ability to design and implement a procedure for obtaining data from websites, and then apply statistical methods to analyze such data.

PROGRAM CONTENT		
Lectures		**Number of hours**
Lec 1	Internet as a source of data supporting decision-making processes.	1
Lec 2	String manipulation utilities.	1
Lec 3	Searching patterns. Regular expression.	2
Lec 4	Data extraction models and techniques.	2
Lec 5	Parsing HTML data,.	3
Lec 6	Writing web crawlers. Case study.	3
Lec 7	Crawling through APIs.	1
Lec 8	Test	2
	Total hours	15

Laboratory		**Number of hours**
Lab1	Course assessment criteria. Rules and safety procedure for laboratory. R as a web scraping environment	1
Lab2	Selected data operations, functional programming, visualization	2
Lab3	String processing, regular expressions	2
Lab4	Task discussion: string processing using a selected web page example	1
Lab4-7	Creating web crawlers for a chosen decision-making problem. Report preparation	7
Lab8	Discussion and report review	2
	Total hours	**15**

TEACHING TOOLS USED
N1. Presentation N2. Solving problems, case study N3. Statistical program R, scripts in R

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming (during semester), P – concluding (at semester end)	Learning outcomes number	Way of evaluating learning outcomes achievement
F1	PEU_W01	Written test
F2	PEU_U01	Assignment
F3	PEU_U01	Report
$P = 0.3 \times F1 + 0.7 \times (0.3 \times F2 + 0.7 \times F3)$		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Kapłon R. *Lecture notes* [available on ePortal/Teams]
[2] Mitchell R. *Web Scraping with Python*, 2nd Edition, O'Reilly Media, 2018.
[3] Wickham H., Çetinkaya-Rundel M., Grolemund G., *R for Data Science*, 2nd Edition, O'Reilly Media, 2023.

SECONDARY LITERATURE:

[4] Aydin O. *R Web Scraping Quick Start Guide*, Packt Publishing, 2018.
[5] Fitzgerald M. *Introducing Regular Expressions*, O'Reilly Media, 2012.

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

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Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish: Seminarium dyplomowe
Name of subject in English: Diploma seminar
Main field of study: Business Engineering
Specialization: Project management
Profile: academic
Level and form of studies: 2nd level, full-time
Kind of subject: obligatory
Subject code W08IZZ-SM0012
Group of courses NO

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)					**15**
Number of hours of total student workload (CNPS)					**50**
Form of crediting					**crediting with grade**
For group of courses mark (X) final course					
Number of ECTS points					**2**
including number of ECTS points for practical classes (P)					**2**
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)					**0,68**

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Cross-sectional knowledge of issues from the previous course of study
2. General knowledge of the subjects pursued in the course of study

SUBJECT OBJECTIVES

C1 To prepare students for the preparation of a Master's thesis according to the requirements.
C2 To acquire the ability to formulate the aim of the thesis and to plan its structure.
C2 To acquire the skills of writing the thesis in terms of using literature sources, carrying out the work and interpreting the results, taking into account editorial recommendations.
C3 To improve the ability to present one's own ideas, concepts and planned solutions.
C4 To consolidate skills of creative discussion in which one can justify and defend one's position in substantive manner.
C5 To prepare for the diploma exam.

SUBJECT EDUCATIONAL EFFECTS

relating to skills:
PEU_U01 Is able to identify a managerial problem and plan its solution using appropriate methods, techniques and tools.
PEU_U02 Can prepare a presentation containing an analysis of results and problem solution concepts.

PEU_U03 Can reason in a discussion, justify ideas and solutions of his/her own and others, as well as critically evaluate and plan actions and solutions of his/her own and others.

PROGRAMME CONTENT

Seminar		Number of hours
Semin 1	Introduction to the seminar. Discussing the class rules and the scoring/grading policy.	1
Semin 2	Overview of university and departmental requirements for thesis. Overview of the process and timeline for graduation. Principles of formulating the topic and purpose of the thesis, adequately to the indicated managerial problem. Examples of good and bad thesis topics/objectives. Discussion of the thesis statement template. Topic, purpose, scope, structure.	2
Semin 3	Overview of the construction of the paper - table of contents, introduction and conclusion. Common mistakes in the work. Referencing and discussion of the progress in choosing a topic and supervisor.	2
Semin 4	Overview of editing requirements. Discussion of how to access literature databases and how to use, analyze, and cite literature sources. Consultation of the first version of the thesis statement. Assignment of dates for individual presentations.	2
Semin 5	Discussion of the criteria for the final evaluation of the work (review form). The concept of plagiarism; anti-plagiarism system. Approval of the final version of the thesis statement. Referring, consulting and discussing problems and progress in the thesis. Presenting recommendations on how to present the progress of the thesis during the next classes.	2
Semin 6	Discussion of the diploma exam. Examination topics and questions. Referencing, consultation and discussion of problems and progress of the thesis. Individual presentations of progress and further plans for completion of the thesis (1). Discussion.	2
Semin 7	Individual presentations of progress and further plans for completion of the thesis (2). Discussion.	2
Semin 8	Individual presentations of progress and further plans for completion of the thesis (3). Discussion.	2
	Total hours	15

TEACHING TOOLS USED

N1.	Presentations of selected issues related to the thesis topic.
N2.	Multimedia presentations - own and foreign (positive and negative examples).
N3.	Problem discussion, recognizing advantages and criticizing disadvantages of solutions.

N4. Individual consultations of students' problems connected with planning and progress of the work

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
F1	PEU_U01	Timely submission and evaluation of a working statement of work (topic, purpose, problem, concept, initial structure)
F2	PEU_U02	Evaluation of the preparation and presentation of the progress of the thesis and plans for further activities.
F3	PEU_U03	Participation in the discussion.
P = 0,3*F1 + 0,5*F2 + 0,2*F3		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

Literature related to the problems of the thesis - independently selected and recommended by the thesis supervisor.

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

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Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish Zaawansowane zarządzanie projektami
Name of subject in English Advanced project management
Main field of study (if applicable): Business Engineering
Specialization (if applicable):Project Management
Profile: academic
Level and form of studies: 2nd level, full-time
Kind of subject: obligatory
Subject code W08IZZ-SM0013
Group of courses YES

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	**30**		**30**	**30**	
Number of hours of total student workload (CNPS)	**75**		**50**	**50**	
Form of crediting	**Examination**		**crediting with grade**	**crediting with grade**	
For group of courses mark (X) final course					
Number of ECTS points	**3**		**2**	**2**	
including number of ECTS points for practical classes (P)			**2**	**2**	
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)	**1,36**		**1,28**	**1,28**	

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

Knowledge of basic waterfall project management processes, knowledge of agile project management, skills of defining, planning and controlling a simple project

SUBJECT OBJECTIVES

C1 Provide students with knowledge on methods and approaches of advanced project management
C2 Develop a critical and creative approach to project management, the ability to create tailor-made solutions for project management

SUBJECT LEARNING OUTCOMES

Relating to knowledge:
PEU_W01: The student understands and has knowledge of: advanced methods in project defining, planning, controlling and closing processes
PEU_W02: the student knows portfolio and program management
PEU_W02: the student understands the notion of project management organizational maturity
PEU_W03: the student knows project sustainable management
PEU_W04: the student knows selected hybrid approaches to project management

Relating to skills:
PEU_U01: The student is able to select and use appropriate methods for project, portfolio and program management and to modify them to the current needs
PEU_U02: The student is able to efficiently present project proposals in calls for projects
Relating to social competences:
PEU_K01: the students is able to discuss project management problems and to elaborate a compromise solution in a small group small.
PEU_K02: the students is able to present orally a project proposal in a very short time duration.

PROGRAMME CONTENT		
Lecture		**Number of hours**
Lec 1	Contemporary needs in project management	2
Lec 2	Project typologies	2
Lec 3	Hybrid approaches to project management	2
Lec 4	Project success definition and criteria	2
Lec 5	Project success factors	2
Lec 6	Advanced project stakeholders management	2
Lec 7	Advanced project risk management	2
Lec 8	Advanced project cost estimation methods	2
Lec 9	Advanced project cost control methods	2
Lec 10	Advanced project scheduling methods	2
Lec 11	Advanced project time control methods	2
Lec 12	Project value definition	2
Lec 13	Project metrics	2
Lec 14	Project sustainable management	2
Lec 15	Organisational project management maturity	2
	Total hours	**30**

Laboratory		**Number of hours**
Lab 1	Repetition of project planning in MS Project based on small case studies	2
Lab 2	Repetition of measuring and evaluating project progress in MS project, based on small case studies	2
Lab 3	Project programme management in MS Project (master and subprojects)	4
Lab 4	Project programme management in MS Project (resource pools)	4
Lab 5	Custom fields and graphical indicators in MS Project	2
Lab 6	Designing reports in MS Project	2
Lab 7	Formatting in MS Project	2

Lab 8	Simulation of a project case study using MS Project – planning	4
Lab 9	Simulation of a project case study using MS Project – control and closing	4
Lab 10	Application of RISKamp to project risk management	4
Lab 11	Application of system dynamics to project management	4
Lab 12	Final exam	2
	Total hours	**30**

Project		**Number of hours**
Proj 1	Presentation of various calls for projects, formation of groups	1
Proj 2	Presentation of principles of writing project proposals	2
Proj 3	Selection of calls and themes by the groups	1
Proj 4	Presentation of project ideas – project 1	2
Proj 5	Presentations of project proposals – project 1	4
Proj 6	Expert evaluation results of project proposals – project 1	2
Proj 7	Lessons learnt – project 1	2
Proj 8	Presentation of project ideas – project 2	2
Proj 9	Presentations of project proposals – project 2	4
Proj 10	Expert evaluation results of project proposals – project 2	2
Proj 11	Lessons learnt – project 2	2
Proj 12	Oral short presentations of project 1	3
Proj 13	Oral short presentations of project 2	3
	Total hours	**30**

TEACHING TOOLS USED
TEACHING METHODS 1. lecture based on multimedia presentation combined with discussion 2. analysis of small case studies in groups 3. Excel with RISKamp add-in 4. the Vensima PL software 5. group work on project proposals, culminating in oral and written presentations.

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
F1	PEU_W01, PEU_U01	project planning - assessment of laboratory work
F2	PEU_W01, PEU_U01	control of project implementation - assessment of laboratory work

F3	PEU_W01, PEU_U01	programme management - evaluation of laboratory work
F4	PEU_W01, PEU_U01	reporting - evaluation of laboratory work
F5	PEU_W01, PEU_U01	risk management - assessment of laboratory work
F6	PEU_W01, PEU_U01	Project simulation - evaluation of laboratory work
F7	PEU_U02, PEU_K01, PEU_K02	evaluation of the project proposal 1 - evaluation of the work on the project
F8	PEU_U02, PEU_K01, PEU_K02	evaluation of the project proposal 2 - evaluation of the work on the project
F9	PEU_W01, PEU_W02, PEU_W03, PEU_W04	Lecture test
P(Lecture)=F9 P(Laboratory)=$\frac{\sum_{i=1}^{6} F_i}{6}$ P(Project)=0,5F7+0,5F8		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Gray C.F., Larson E.W., Desai G.V. (2013), Project Management, MCGraw Hill;
[2] Kerzner H. (2005), Advanced Project Management Edycja Polska, Helion
[3] Kerzner H. (2017), Project Management Metrics, KPIs, and Dashboards: A Guide to Measuring and Monitoring Project Performance, Wiley
[4] Wysocki R.K. (2014), Effective Project Management, John Wiley & Sons;

SECONDARY LITERATURE:

[1]Brzozowska A. (2021), A functional approach to sustainable project management, Taylor and Francis
[2] Grucza B. (2019), Zarządzanie interesariuszami projektu, PWE
[3] Hoffmann M.R. (2015), How to write effective EU proposals, EU
[4] Moustafaev J. (2015), Project scope management, CRC Press
[5] Venkataraman R.R., Pinto K.P. (2008), Cost and Value Management in Projects, John Wiley & Sons.

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Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish: Zarządzanie biznesem 1. Strategia i model biznesu przedsiębiorstwa
Name of subject in English: **Business management 1. Strategy and business model of the enterprise**
Main field of study (if applicable): Inżynieria zarządzania
Specialization (if applicable): Zastosowania IT w biznesie, Ogólnotechniczna
Profile: academic
Level and form of studies: Second level, full-time
Kind of subject: obligatory
Subject code W08IZZ-SM0014
Group of courses NO

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	**15**			**30**	
Number of hours of total student workload (CNPS)	**50**			**50**	
Form of crediting	**Examination**			**crediting with grade**	
For group of courses mark (X) final course					
Number of ECTS points	**2**			**2**	
including number of ECTS points for practical classes (P)				**2**	
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)	**0,76**			**1,28**	

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

Basic knowledge of the organization and management of the enterprise

SUBJECT OBJECTIVES

Providing practical knowledge, taking into account its application aspects, regarding:
C1 Methods of designing strategies of innovative enterprises
C2. Methods of creating business models
C3 Stages of the design process of an innovative enterprise (startup) according to the Lean start-up concept
C4 Strategic context of the company's operation Development of basic skills regarding:
C5 Creating and testing MVP (minimum viable product) and designing a start-up company
C6. analysis and evaluation of the company's strategic starting position (diagnosis of external and internal conditions),

SUBJECT EDUCATIONAL EFFECTS

In the field of knowledge:
PEU_W01 - has an extended and deepened knowledge of the methods of designing an innovative enterprise
PEU_W02 - knows the stages of the cycle of creating an innovative company
In the field of skills:
PEU_U01 - can identify the needs of a potential customer, create variants of solutions and design a minimally satisfactory product (MVP)

PEU_U02 - is able to construct a business model of a potential start-up company

In the field of social competences:

PEU_K01 - is aware of the barriers, limitations and threats appearing in the entrepreneur's environment

PEU_K02 - can cooperate with other members of the project team to create innovative solutions

PEU_K03 - is prepared to participate in the process of strategic planning and implementation of a selected development strategy

PROGRAMME CONTENT		
Lecture		**Number of hours**
Lec 1	Introduction to designing an enterprise strategy	1
Lec 2	Vision, mission and basic values of the company	2
Lec 3	Strategic analysis of the business environment	2
Lec 4	Strategic analysis of the company's business potential	2
Lec 5	SWOT matrix and generating strategic options	2
Lec 5	Models of strategy for enterprises	2
Lec 7	Strategy implementation	2
	Total hours	**15**

Project		**Number of hours**
Proj 1	Introductory classes - discussion of the assumptions of the project. Selection of project groups	2
Proj 2	Defing the problem of project subject	2
Proj 3	Solution creating	2
Proj 4	Building quick prototypes - description of the product prototype	2
Proj 5	Development of assumptions and features of a minimally satisfactory product (MVP)	2
Proj 6	Target market segmentation	2
Proj 7	Conquering the “beachhead market”	2
Proj 8	Defining value preposition	2
Proj 9	Matching the value proposition to the target segment (product - market fit)	2
Pr 10	Creating business model	2
Pr 11	Product and business model testing - interviews with potential clients	2
Pr 12	Designing a change in the business model - pivot	2
Pr 13	Firm visualisation	2
Pr 14	Presentation the innovative firm – pich deck	2
Pr 15	Summary, discussion and general remarks	2
	Total hours	30

TEACHING TOOLS USED
N1. Lecture with the use of a multimedia presentation N2. Own work - designing an innovative enterprise according to defined stages N3. Presentation of the start-up's assumptions in the form of a presentation N4. Discussion of innovative companies' proposals

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
F1	PEU_U01-2	Developing the assumptions of an innovative company
F2	PEU_U01-2, PEKU_K01-2	Assessment of the presentation, group work, participation in the discussion
P (Project) = F1+F2	Project P= F1 (50%) + F2 (50%)	
F3	PEU_W01	Exam
F4	PEU_W02	Exam
F5	PEU_U01-2, PEU_K01-3	Exam
P (Lecture) = F3(50%) +F4 (25%) +F5 (25%)		

PRIMARY AND SECONDARY LITERATURE
PRIMARY LITERATURE:
Gierszewska G., Olszewska B., Skonieczny J., „Zarządzanie strategiczne dla inżynierów” PWE Warszawa 2013 Zarządzanie strategiczne. Systemowa koncepcja biznesu, pod red. M. Moszkowicza, PWE Warszawa 2005 [3] Eric Ries, *Metoda Lean Startup. Wykorzystaj innowacyjne narzędzia i stwórz firmę, która zdobędzie rynek*, Onepress, 2011 [4] Alexander Osterwalder, Yves Pigneur, *Tworzenie modeli biznesowych. Podręcznik wizjonera*, Helion, 2012
SECONDARY LITERATURE:
[1] Ash Maurya, Metoda Running Lean. Iteracja od planu A do planu, który da Ci sukces, Helion, 2012 [2] Johson G., Scholes K., Whittington R. Podstawy strategii, PWE, Warszawa 2010 [3] Kaplan R.S, Norton D.P., Strategiczna karta wyników. Jak przełożyć strategię na działanie, Wydawnictwo naukowe PWN, Warszawa 2009 [4] Obłój K., Strategia organizacji, PWE, Warszawa 2014 [5] Steve Blank, Bob Dorf, Podręcznik startupu. Budowa wielkiej firmy krok po kroku, Helion, 2012
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Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish: Zarządzanie biznesem 2: Finansowanie rozwoju biznesu
Name of subject in English: Business management 2: Financing the development of business
Main field of study (if applicable): Business engineering
Specialization (if applicable): Project management
Profile: academic
Level and form of studies: 2nd level, full-time
Kind of subject: obligatory
Subject code W08IZZ-SM0015
Group of courses NO

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	**15**			**45**	
Number of hours of total student workload (CNPS)	**50**			**75**	
Form of crediting	Crediting with grade			Crediting with grade	
For group of courses mark (X) final course					
Number of ECTS points	**2**			**3**	
including number of ECTS points for practical classes (P)				**3**	
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)	**0,68**			**1,88**	

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Has a general knowledge of management

SUBJECT OBJECTIVES

C1 To acquire knowledge and to familiarise students with the problems of financing business development and functioning.
C2 To acquire practical management skills for initiating and developing business.

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:
PEU_W01 Has a structured knowledge of the classification of sources of company financing,
PEU_W02 Characterizes and knows particular sources of financing and conceptual models of running a business,
PEU_W03 Characterizes and knows basic tools and techniques used in the process of acquiring a business investor,
relating to skills:

PEU_U01 Is able to match sources of finance to the needs and capabilities of the business,
PEU_U02 Can, in practice, correctly prepare a business presentation - Pitch for investors,
PEU_U03 Has the ability to search and analyse the support offer of business environment institutions.

relating to social competences:

PEU_K01 Is aware of the importance of the SME sector in economic practice,
PEU_K02 Is aware of the need to constantly improve own knowledge,
PEU_K03 Is aware of ethical obligations, related to the role of an entrepreneur.

PROGRAMME CONTENT		
Lecture		**Number of hours**
Lec 1	Analysis of the determinants of company development - capital barriers and catalysts for SME development.	**1**
Lec 2	The procedure for setting up a business: identification of the advantages and disadvantages of different forms of business; identification of practical requirements to be met and activities to be carried out when setting up a business.	**2**
Lec 3	Financing in the SME sector. Sources of business financing. Financing from own resources: ● founding FFF (Friends, Family and Fools), ● Bootstrapping, ● Business angels, ● Venture capital funds.	**2**
Lec 4	External third-party funding sources: ● Crowdfunding - overdraft crowdfunding, ● Medium and long-term, working capital/investment loans, ● Loan vs, ● Credit guarantee funds, ● Loan funds, ● Other forms of debt financing: ➢ Leasing, ➢ Factoring, ➢ Trade credit.	**2**
Lec 5	Sources of public funding for start-ups and funding within business environment institutions: ● Business incubators, ● Technology parks, ● Technology transfer centres, ● Grants, support for targeted projects, support for SMEs, ● direct support for investments in micro, small and medium-sized enterprises, ● support for commercialisation of scientific research, ● innovation voucher, co-financing of targeted projects in the field of practical applications for SMEs.	**2**
Lec 6	New Connect and e-sale - alternative trading system.	**2**
Lec 7	Ways of gaining an investor - formalities connected with it.	**2**
Lec 8	Colloquium	**2**

	Total hours	**15**

Project		**Number of hours**
Proj 1	Introduction to the workshop - definition of the objective in the form of a presentation to investors with particular emphasis on the assumptions of the financial model of the new business venture.	**3**
Proj 2	Choice of: legal form, income tax form, accounting form, VAT and excise duties.	**3**
Proj 3	Costs of setting up a business: ● The cost of filing for Social Security, ● Other costs of setting up a business, ● Costs of civil law transaction tax (PCC) and notary fees, ● Costs of day-to-day operations, ● Fixed, "obligatory" costs, ● Entrepreneurial discounts.	**3**
Proj 4	Sources of finance and revenue - case study analysis from a financial point of view.	**3**
Proj 5	Target costing and spreadsheet accounts in business planning.	**3**
Proj 6	Sales traction - in constructing a sales budget.	**3**
Proj 7	Methods of determining sales margins- How to build effective pricing and sales strategies.	**3**
Proj 8	Evaluating the financial effectiveness of a new business investment- NPV and IRR.	**3**
Proj 9	Can you be ready for bankruptcy? Can you protect yourself against business failure? How should one protect the assets of an entrepreneur?	**3**
Proj 10	Identifying and estimating risk and securing against the risks of doing business	**3**
Proj 11	Due diligence - investor valuation. When and for what purpose we sell a company. The problem of succession of SMEs.	**3**
Proj 12	Financial model: ● Monetisation, ● Hockey stick, ● Burn rate, ● Pich deck.	**3**
Proj 13	How to properly construct a presentation in front of an investor?	**3**
Proj 14	Presentation of own business, with indication of the level of raised funds, in front of a potential investor by individual groups.	**3**
Proj 15	Summary of the workshop and evaluation	**3**

	Total hours	**45**

TEACHING TOOLS USED
N1. Multimedia presentation with the use of the projector N2. Presentation of diagnostic work N3. Discussion of effects (possible reasons of failure) during the presentation of student's work

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
F1	PEU_W01 PEU_W02 PEU_W03	Participation in problem discussions.
F2	PEU_U01 PEU_U02 PEU_U03	Verification of knowledge in the form of a final colloquium.
F3	PEU_U01 PEU_U02 PEU_U03	Evaluation of the degree of understanding of problem issues from the perspective of solving them (the effectiveness of the presented solution).
F4	PEU_U01 PEU_U02 PEU_U03 PEU_ K01 PEU_ K02 PEU_ K03	Preparation of a creative work on business financing project.
P(lecture) = F1 P (project) = 0,2*F2+0,4*F3+0,4*F4		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Praca zbiorowa pod redakcją Dukto, M. (2021), Biblia e-biznes 3.0, Helion.
[2] Parkitna, A., Tutaj, J., Urbańska, K. (2018, 2019) Jak założyć i prowadzić działalność gospodarczą, cz.1 i 2, Świdnica. http://um.swidnica.pl/media/PAULA%20STRONA/poradnik_dzialanosc_w_PL_pl.pdf
[3] Kotarbiński, J. (2008). Sztuka rynkologii. Onepress.

SECONDARY LITERATURE:

[1] [1] Kolmas, P. (2008). Sprzedaż pogłębiona 2.0. Sprzedawaj więcej, skuteczniej i za każdym razem. Onepress.
[2] Skowronek-Mielczarek, A. (2005). Małe i średnie przedsiębiorstwa: źródła finansowania (2. wyd. zaktualizowane i uzup., Vademecum Menedżera). Warszawa. C.H. Beck.
[3] Kotler, P., Keller, K., Pilarczyk, B., Mruk, H., Zawiślak, M., Środa, J. (2012). Marketing. Poznań. Dom Wydawniczy REBIS.
[4] Krzyworączka, P. (2008). 70 sposobów na rozkochanie KLIENTA... w Twoim e-biznesie. Onepress.

[5] Grudowski, P. (2017). Wpływ outsourcingu na poprawę skuteczności wybranego procesu pomocniczego – studium przypadku. Handel Wewnętrzny, (370), 190-199.
Mutwil, A. (2016). Analiza rynku Business Process Outsourcing w logistyce. Marketing i Zarządzanie, 42(1), 127-138.

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Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish Warsztat badacza
Name of subject in English Research workshop
Main field of study (if applicable): Business Engineering
Specialization (if applicable): Project management
Profile: academic
Level and form of studies: 2nd level magister studies, full-time
Kind of subject: obligatory
Subject code W08IZZ-SM0017
Group of courses NO

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)					**15**
Number of hours of total student workload (CNPS)					**25**
Form of crediting					crediting with grade
For group of courses mark (X) final course					
Number of ECTS points					**1**
including number of ECTS points for practical classes (P)					**1**
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)					**0,68**

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Basic knowledge of the paradigms and theories of management and quality sciences.
2. Knowledge of basic methodological problems.

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SUBJECT OBJECTIVES

C1: Acquiring the knowledge necessary to conduct research and publishing the results of this research.
C2: Acquiring the ability to apply knowledge in practice for the design, implementation and description of empirical research, critical analysis of literature and editing of scientific texts.

SUBJECT EDUCATIONAL EFFECTS/ SUBJECT LEARNING OUTCOMES

PROGRAMME CONTENT

	Seminar	Number of hours
Sem1	Introduction – methods of conducting scientific research	1
Sem2	Methods of searching and acquiring scientific knowledge	2
Sem3	What, how and where could be published?	2
Sem4	Scientific research – characteristic, structure and editing requirements.	2
Sem5	Presentation of scientific research and public speech	2
Sem6	Methods of conducting a critical analysis of the literature - a review	2
Sem7	Methods of designing, implementing and describing empirical research - a review	2
Sem8	Crediting with a grade	2
	Suma godzin	**15**

TEACHING TOOLS USED

N1. Multimedia presentation
N2.
N3.

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
F1	PEU-W01-W03 PEU-U01-U03	Presentation of the chosen scientific paper prepared and presented by the student
P = F1		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Jonker, J., & Pennink, B. (2010). The essence of research methodology: A concise guide for master and PhD students in management science. Springer Science & Business Media.

[2] Taylor, B., Sinha, G., & Ghoshal, T. (2006). Research methodology: A guide to for reseachers in management and social sciences. PHI Learning Pvt. Ltd..

[3] Czakon, W. (Ed.). (2011). Podstawy metodologii badań w naukach o zarządzaniu. Wolters Kluwer Polska.

SECONDARY LITERATURE:

[1] Becker, H. S. (2008). Writing for social scientists: How to start and finish your thesis, book, or article. University of Chicago Press.

[2] Scandura, T. A., & Williams, E. A. (2000). Research methodology in management: Current practices, trends, and implications for future research. Academy of ManagementJjournal, 43(6), 1248-1264.

[3] Juszczyk, S. (2013). Badania jakościowe w naukach społecznych szkice metodologiczne. Katowice, Poland: Wydawnictwo Uniwersytetu Śląskiego.

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

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Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish Zarządzanie projektami – gry symulacyjne
Name of subject in English Project management – simulation games
Main field of study (if applicable): Business Engineering
Specialization (if applicable):Project management
Profile: academic
Level and form of studies: 2nd level, full-time
Kind of subject: obligatory
Subject code W08IZZ-SM0018
Group of courses YES

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	**15**		**15**		
Number of hours of total student workload (CNPS)	**25**		**25**		
Form of crediting			**crediting with grade**		
For group of courses mark (X) final course			**X**		
Number of ECTS points			**2**		
including number of ECTS points for practical classes (P)			**2**		
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)			**1,36**		

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

Knowledge of waterfall project management processes, skills of defining, planning, executing controlling and closing a project

SUBJECT OBJECTIVES

C1 Provide students with knowledge on methods in project management across project life cycle
C2 Develop a critical and creative approach to project management, the ability to create tailor-made solutions for project management

SUBJECT LEARNING OUTCOMES

Relating to knowledge:
PEU_W01: The student understands and has knowledge of methods in project defining, planning, executing, controlling and closing processes
Relating to skills:
PEU_U01: The student is able to select and use appropriate methods for project management and to modify them to the current needs
PEU_U02: The student is able to manage a project in a simulated environment
Relating to social competences:
PEU_K01: the students is able to discuss project management problems and to elaborate a compromise solutions in a small group

PROGRAMME CONTENT		
Lecture **2 series of lectures: the first should have 7 hours, the second 8 hours** **Room - a layout that allows workshops to be conducted, e.g. 4.48 B4**		**Number of hours**
Lec 1	Project management - concepts and methods necessary to conduct a workshop game and a simulation game	2
	Project management simulation game - rules and guidelines	2
	Workshop game in project management - rules and guidelines, project initiation and planning phase	3
Lec 2	Workshop game - the course of the game in the project executing phase	6
	Workshop game - summary, conclusions, Lessons Learned	2
	Total hours	**15**

Laboratory **2 series of laboratories: the first should have 8 hours, the second 7 hours** **Laboratory room available for 4 days (2 days - one group of students, 2 days - the second group of students)**		**Number of hours**
Lab 1	Introduction to the simulation game - repeating the key principles	1
	Project planning phase, which includes: – build a project team by matching resources with required competencies for (at least) initial activities, in terms of the amount of resources needed to achieve the required performance; – plan risk mitigation activities in relation to risks entered in the register; – prepare a meeting agenda, activity-level quality reviews and project-level (calendar) reviews; – plan monitoring activities so that you know if project is behind schedule or over budget.	2
	Project Management Phase - Gameplay 1	3
	Preparation of a report after 1 game	1
	Presentation of the project report after 1 game	1
Lab 2	Project Management Phase - Gameplay 2	3
	Preparation of a report after 2 game	1
	Presentation of the project report after 2 game	1
	Conclusions and Lessons Learned	2
	Total hours	**15**

TEACHING TOOLS USED
TEACHING METHODS 1. theoretical lecture combined with workshop game 2. Project management simulator (e.g. Simultrain®) 3. Lessons Learned

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
F1	PEU_W01 PEU_U01 PEU_U02 PEU_K01	Assessment of students' work during the workshop game
F2	PEU_W01 PEU_U01 PEU_U02 PEU_K01	Assessment of students' work during a simulation game
P=0,4*F1+0,6*F2		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

1. Gray C.F., Larson E.W., Desai G.V. (2013), Project Management, MCGraw Hill
2. Kerzner H. (2005), Advanced Project Management Edycja Polska, Helion
3. Kerzner H. (2017), Project Management Metrics, KPIs, and Dashboards: A Guide to Measuring and Monitoring Project Performance, Wiley

SECONDARY LITERATURE:

1. Grucza B. (2019), Zarządzanie interesariuszami projektu, PWE
2. Moustafaev J. (2015), Project scope management, CRC Press
3. Venkataraman R.R., Pinto K.P. (2008), Cost and Value Management in Projects, John Wiley & Sons
4. Wysocki R.K. (2014), Effective Project Management, John Wiley & Sons

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

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Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish Zarządzanie biznesem III: Współczesny marketing
Name of subject in English Business management III: Contemporary marketing
Main field of study (if applicable): Business Engineering
Specialization (if applicable): Project management
Profile: academic
Level and form of studies: 2nd level, full-time
Kind of subject: obligatory
Subject code W08IZZ-SM0019
Group of courses NO

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	**15**			**30**	**15**
Number of hours of total student workload (CNPS)	**50**			**50**	**25**
Form of crediting	**crediting with grade**			**crediting with grade**	**crediting with grade**
For group of courses mark (X) final course					
Number of ECTS points	**2**			**2**	**1**
including number of ECTS points for practical classes (P)				**2**	**1**
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)	**0,68**			**1,28**	**0,68**

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Basic knowledge of marketing
2. Knowledge and skills in the use of statistics to analyze and evaluate data

SUBJECT OBJECTIVES

C1 The aim of the course is to acquaint students with the principles of formulation and implementation of contemporary marketing strategies.

SUBJECT LEARNING OUTCOMES

In the field of knowledge:
PEU_W01 The student understands the relationship between traditional and contemporary marketing management
PEU_W02 The student knows the rules of creating a strong and distinctive brand in the digital age
PEU_W03 The student understands the importance of the Internet in marketing management, with particular emphasis on the concept of CRM in creating relationships with the consumer

In the field of skills:
PEU_U01 The student is able to use modern marketing tools, especially in the area of digital marketing
PEU_U02 The student is able to plan and implement marketing activities in a modern enterprise
PEU_U03 The student is able to manage relations with a modern client
PEU_U04 The student is able to discuss practical issues concerning modern concepts of marketing management
In the field of social competences:
PEU_K01 The student understands the consequences of actions taken as part of modern marketing on entities participating in the exchange and other stakeholders

PROGRAMME CONTENT		
Lecture		**Number of hours**
Lec 1	Contemporary marketing management - genesis and key concepts. Market orientation in the economy.	2
Lec 2	Determinants of market activities of enterprises - market environment.	2
Lec 3	Marketing instrumentation management.	2
Lec 4	Enterprise market relations.	2
Lec 5	Marketing communication management.	2
Lec6	Consumer relationship management.	2
Lec7	Creating brand value.	2
Lec 8	E-marketing.	1
	Total hours	**15**

Project		**Number of hours**
Proj 1	Organizational classes: discussing the conditions for passing a credit, presenting the substantive scope of the project, creating project teams.	2
Proj 2	Determinants of market activities of enterprises - market environment - individual consultations.	2
Proj 3	Determinants of market activities of enterprises - market environment - presentations.	2
Proj 4	Marketing instrumentation management - individual consultations.	2
Proj5	Marketing instrumentation management - presentations.	2
Proj 6	Company market relations - individual consultations.	2
Proj 7	Company market relations - presentations ..	2
Proj 8	Marketing communication management - individual consultations.	2
Proj 9	Marketing communication management - presentations.	2
Proj 10	Consumer relationship management - individual consultations.	2
Proj 11	Managing relations with consumers - presentations.	2
Proj 12	Creating brand value - individual consultations.	2
Proj 13	Creating brand value - presentations.	2
Proj14	E-marketing - individual consultations.	2

Proj15	E-marketing - presentations.	2
	Total hours	**30**

Seminar		**Number of hours**
Sem 1-	Organizational classes - establishing the mode and schedule of classes, selection of topics by students.	1
Sem 2	Content Marketing, Social Media Marketing.	2
Sem 3	Mobile marketing, On-line advertising, E-mail marketing.	2
Sem 4	Web analytics, Online stores, E-commerce platforms.	2
Sem 5	CRM strategies in the digital environment, Word-of-mouth Marketing, Viral Marketing.	2
Sem 6	Shockvertising, Ambient media, Partysan Marketing.	2
Sem7	Neuromarketing, Building your own brand, Regional marketing.	2
Sem 8	Summary of the course.	2
	Total hours	**15**

TEACHING TOOLS USED
N1. Informative lecture supported by multimedia presentation N2. Problem lecture supported by a multimedia presentation N3. Case studies N4. Project prepared by students N5. Problem tasks

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
F1	PEU_W01 PEU_W02 PEU_W03	Final test
F2	PEU_U01 PEU_U02 PEU_U03 PEU_K01	Project
F3	PEU_U01 PEU_U02 PEU_U03 PEU_K01	Project stages presentations
F4	PEU_U04	Theoretical presentations
F5	PEU_U04	Tasks
P (lecture) = F1 P (project) = 0,6*F2+0,4*F3 P (seminar) = 0,8*F4+0,2*F5		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Kotler Ph., Keller K., Marketing, Dom Wydawniczy REBIS, Poznań 2020
[2] e-Marketing przedsiębiorstwa w społeczności wirtualnej, Difin, Warszawa 2012

SECONDARY LITERATURE:

[3] Kotler, P., Kartajaya, H., Setiawan, I., Gasper, D., Marketing 4.0: Era cyfrowa, MT Biznes, Warszawa 2017
[4] Świerczyńska-Kaczor U., Królewski J., Sala P., E-marketing : współczesne trendy: pakiet startowy, Wydawnictwo Naukowe PWN, Warszawa 2014
[5] Skorupska J., E-commerce: strategia - zarządzanie - finanse , Wydawnictwo Naukowe PWN, Warszawa 2017

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Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish Negocjacje w biznesie
Name of subject in English Negotiations in business
Main field of study (if applicable): Business engineering
Specialization (if applicable): Project management
Profile: academic
Level and form of studies: 2nd level, full-time
Kind of subject: optional
Subject code W08IZZ-SM0021
Group of courses NO

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)					**30**
Number of hours of total student workload (CNPS)					**50**
Form of crediting					**crediting with grade**
For group of courses mark (X) final course					
Number of ECTS points					**2**
including number of ECTS points for practical classes (P)					**2**
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)					**1,28**

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Basic knowledge of communication
2. Ability to work in a group and to cooperate

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SUBJECT OBJECTIVES

The main aim of the course is to provide knowledge and information about negotiations and interpersonal communication. After completing the course, the student should understand the basic principles of the negotiation process, know the types of behavior, be able to communicate in various situations, and be able to take an active, subjective role in improving his skills.
The aim of the course is also to familiarize the participant with the negotiation skills that a manager should have and the methods of resolving conflict situations:
C1. Gaining knowledge in the field of effective communication and effective decision making,
C2. Ability to conduct negotiations, proper argumentation
C3. Gaining knowledge in the field of generating methods of solving conflicts

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:

- PEU_W01 Has a structured knowledge of interpersonal skills and the principles of the negotiation process
- PEU_W02 Knows the basic negotiation techniques
- PEU_W03 Understands communication tools used in the negotiation process

relating to skills:
PEU_U01 is able to lead the negotiating team
PEU_U02 is able to negotiate effectively
PEU_U03 is able to effectively communicate his position and argue
relating to social competences:
PEU_K01 Is prepared to manage a negotiating team and participate in planning and conducting negotiations and resolving conflict situations.

PROGRAMME CONTENT

Seminar		Number of hours
Semin 1-Semin 2	The essence and role of negotiation. Negotiations and a consultation. Characteristics and components of negotiation situations. Parties to Negotiations, Types of negotiations, types of agreement in negotiations. The negotiator's profile and the negotiating team. Case study.	4
Semin 3-Semin 4	Preparation of negotiations. Stages of negotiation, defining negotiation issues, analysis of the other party, BATNA, Formulating a relationship in negotiations. Case study	4
Semin 5-Semin 6	Positional negotiations, Characteristics. Techniques, styles and negotiation strategies. Budget negotiations. Techniques of exerting social influence and argumentation.	4
Semin 7-Semin 8	Intergation negotiations. Properties of the negotiations. Factors hindering the achievement of an integrative solution. Stages of integration negotiations. Compromise versus consensus. The problem and its components ,Multilateral negotiations. Case study.	4
Semin 9-Semin 10	Team and communication in negotiations. Negotiation team (composition, roles, strategy), Verbal and non-verbal communication. Principles of proper communication. Case study	4
Semin 11-Semin 12	Managers' mistakes during negotiations. Errors at the stage of preparing negotiations. Errors at the stage of conducting negotiations. Case study.	4
Semin13-Semin 14	Ways of conflict resolution. Techniques of generating solutions (classic, redefining the problem). The role of mediation in negotiations. Case study- management contract.	4
Semin 15	Summary of the classes. Pass. Discussion of the results. Discussion.	2
	Total hours	30

TEACHING TOOLS USED

N1. Studies of negotiation cases
N2. Discussion with the participants
N3. Own and group work

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P –	Learning outcomes code	Way of evaluating learning outcomes achievement

concluding (at semester end)		
F1	PEU_U01	Case study, activity in discussion
F2	PEU_U02	Case study, active in discussions
F3	PEU_U03 PEU_W01 PEU_W02 PEU_W03 PEU_K01	Case study, team activity
P= 33,33% F1+33,33%F2+33,33%F3		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Carre, C. (2008). Sztuka rozwiązywania konfliktów. Katowice: VIDEOGRAF II
[2] Fowler,A. (2001). Jak skutecznie negocjować. , Warszawa: Wydawnictwo Petit
[3] Kałążna-Drewińska, U. (2006). Negocjacje w biznesie. Kluczowe problemy. Wrocław: Wydawnictwo Akademii Ekonomicznej we Wrocławiu

SECONDARY LITERATURE

[1] Kamiński, J., (2003). Negocjowanie. Techniki rozwiązywania konfliktów. Warszawa: Poltext
[2] Kamiński, J.,(2006). Negocjacje w działalności marketingowej przedsiębiorstw. Białystok: Wydawnictwo Uniwersytetu w Białymstoku
[3]Lewicki, R.J., (2005). Zasady negocjacji : kompendium wiedzy dla trenerów i menedżerów. Poznań: REBIS.
[4] Watkins, M. (2005). Sztuka negocjacji w biznesie. Gliwice: Wydawnictwo HELION
[1] Dobek–Ostrowska,B.,(2007).Podstawy komunikowania społecznego. Wrocław: Wydawnictwo ASTRUM
[2] Doliński, D. (2005). Techniki wpływu społecznego. Warszawa: Scholar.
[3] Fisher, R., Shapiro, D. (2009). Emocje w negocjacjach. Warszawa: Jacek Santorski & Co Agencja Wydawnicza

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Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish Organizacja i zarządzanie czasem pracy
Name of subject in English Organization and management of work time
Main field of study (if applicable): Business Engineering
Specialization (if applicable): Project management
Profile: academic
Level and form of studies: 2st level, full time studies
Kind of subject: optional
Subject code W08IZZ-SM0022
Group of courses NO

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)					**30**
Number of hours of total student workload (CNPS)					**50**
Form of crediting					**crediting with grade**
For group of courses mark (X) final course					
Number of ECTS points					**2**
including number of ECTS points for practical classes (P)					**2**
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)					**1,28**

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. 1. Basic knowledge of psychology

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SUBJECT OBJECTIVES

C1 To provide students with knowledge about the psychological conditions of working time organization
C2 To familiarize students with coping techniques, dealing with time deficit
C3 Familiarizing students with the principles of effective work organization and time management

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:

PEU_W01 – student has knowledge of psychological mechanisms and conditions of working time organization

PEU_W02 - student knows the principles of effective work organization and time management

relating to skills:

PEU_U01 student is able to identify the individual style of time organization at work

PEU_U02 student is able to independently develop a time management strategy at work.

In the field of social competences:

PEU_K01 Student is able to cooperate and work in various forms of work organization.

PEU_K02 Student is ready to flexibly search for and select methods and techniques for work organization and management of the work time.

PROGRAMME CONTENT

	Seminar	**Number of hours**
Se1	The role of time in human life and work. Psychobiological conditions for the effective use of time.	2
Se2	Diagnosis of the individual style of experiencing time and its behavioral implications.	2
Se3	Flexible forms of work. Psychological conditions for optimizing the use of time.	2
Se4	Identification of individual time management.	2
Se5	Methods for analyzing the use of time. Analysis of the time used. Analysis of lost time. Identification of "time thieves".	2
Se6	Feeling and dealing with time pressure. Procrastination phenomenon.	2
Se7	Defining your own visions and goals. Specifying the image of your own career. Checking the possibilities and means of achieving the objectives.	2
Se8	The hierarchy of professional tasks and prioritization.	2
Se9	The system of effective planning of tasks at work. Rules for using schedules.	2
Se10	Rules for organizing your own work. Organization of the territory of operation. Organization of meetings, meetings and telephone conversations	2
Se11	Work time management. Organization of professional tasks.	2
Se12	Development of detailed action programs. Task delegation system.	2
Se13	Control of work and time management effects.	2
Se14	Psychological principles of optimizing the use of time. Developing an individual strategy to deal with time.	2
Se15	Analysis of individual time management strategy.	2
	Total hours	30

TEACHING TOOLS USED

N1. Moderated discussion

N2. Exercises and simulations

N3. Individual exercises

N4. Multimedia presentations N5. Case studies

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
F1	PEU_K01; PEU_K02	Written project performance
F2	PEU_U01; PEU_U02	Presentation of the task completion
F3	PEU_W01; PEU_W02	Test
P = (F1 + F2 + F3)/3 - - computed in percentage points (%), transformed into the scale 2-5.5		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Clayton, M. (2011). *Zarządzanie czasem, czyli jak efektywnie planować i realizować zadania.* Warszawa: Edgard.
[2] Sasin, M. (2016). *Efektywny system pracy, czyli jak skutecznie zarządzać sobą w czasie.* Warszawa: Wydawnictwo Helion.
[3] Tracy, B. (2018). *Zarządzanie czasem*. Warszawa: Wydawnictwo Muza.

SECONDARY LITERATURE:

[1] Bliss, E.C. (1992). *Jak gospodarować swoim czasem.* Poznań: Wyd. UAM.
[2] Heppell, M. (2013). *Jak zaoszczędzić godzinę dziennie? Sprawne zarządzanie czasem.* Warszawa: Wydawnictwo Helion.
[3] Kozioł, L. (2000). *Zarządzanie czasem pracy.* Kraków: Wydawnictwo Antykwa.
[4] Maige, Ch., Muller, J.L. (1995). *Walka z czasem*. Warszawa: Poltext.
[5] McRae, B.C. (1994). *Praktyczne gospodarowanie czasem*. Warszawa: M & A Communications Polska.
[6] Seiwert, L.J. (1998). *Jak organizować czas.* Warszawa: PWN
[7] Seiwert, L.J. (2005). *Zarządzanie czasem. Bądź panem własnego czasu.* Warszawa: Agencja Wydawnicza Placet.
Seiwert, L., Woeltje, H. (2012)**.** *Efektywne zarządzanie czasem. Jak wykorzystać Microsoft Outlook do zorganizowania pracy i życia osobistego*. Warszawa: Promise.

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Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish: Rozwiązywanie konfliktów i negocjacje
Name of subject in English: Conflict resolving and negotiations
Main field of study (if applicable): Business Engineering
Specialization (if applicable): Project Management
Profile: academic
Level and form of studies: 2nd level, full-time studies
Kind of subject: obligatory
Subject code W08IZZ-SM0023
Group of courses NO

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)					**30**
Number of hours of total student workload (CNPS)					**50**
Form of crediting					**crediting with grade**
For group of courses mark final course with (X)					
Number of ECTS points					**2**
including number of ECTS points for practical (P) classes					**2**
including number of ECTS points for direct teacher-student contact (BK) classes					**1,28**

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Basic knowledge in psychology.

SUBJECT OBJECTIVES

C1. Getting knowledge in the area of interpersonal, group and organizational conflicts.
C2. Familiarizing students with the methods of conflict resolution in groups and organizations.
C3. Increasing conflict management competences in groups, teams and organizations.

SUBJECT LEARNING OUTCOMES

relating to knowledge:

PEU_W01 - Has knowledge of psychological mechanisms and processes determining the formation and development of conflict.

PEU_W02 - Knows the principles of correct mediation and negotiation.

relating to skills:

PEU_U01 - Is able to independently analyze the conflict situation.

relating to social competences:

PEU_K01 Is ready to search, select and create tools for solving problems appearing in teams and organizations.

PEU_K02 Is ready to critically assess and resolve problems arising during professional activity and leadership in conflict management at the workplace, bearing in mind the good of the team, organization and social.

Seminar		**Number of hours**
Sem 1	Conflict - psychological, social and organizational determinants	2
Sem 2	The role of communication in conflicts	2
Sem 3	Analysis of conflict areas in contemporary markets and organizations - case studies	2
Sem 4	Phenomena accompanying conflicts - aggression, prejudices, stereotypes	2
Sem 5	The course, conflict dynamics, identification of conflict situation features	2
Sem 6	Ways of conflict resolution - diagnosis of individual styles of conflict resolution	2
Sem 7	Simulation of a conflict situation - group A	2
Sem 8	Simulation of a conflict situation – group B	2
Sem 9	Simulation of a conflict situation – group C	2
Sem 10	Simulation of a conflict situation – group D	2
Sem 11	Simulation of a conflict situation – group E	2
Sem 12	Simulation of a conflict situation – group F	2
Sem 13	Presentation and analysis of student reports	2
Sem 14	Presentation and analysis of student reports	2

15	Presentation and analysis of student reports	2
	Total hours	30

TEACHING TOOLS USED
N1. Lecture N2. Group exercises N3. Simulations N4. Team work N5. Discussion of problems and results of works N6. Presentation of reports prepared by students

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming (during semester), C – concluding (at semester end)	Learning outcomes number	Way of evaluating learning outcomes achievement
F1	PEU_W01- PEU_W02 PEU_U01 PEU_K01-PEU_K02	Simulation report
F2	PEU_W01- PEU_W02 PEU_U01 PEU_K01-PEU_K02	Analytical report
F3	PEU_W01- PEU_W02 PEU_U01 PEU_K01-PEU_K02	Activity during classes
C = 0,4 F1+ 0,4 F2 + 0,2 F3		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Witkowski, T., Chełpa, S. (2015) *Psychologia konfliktów*. Wrocław, Bez Maski
[2] Borecka-Biernat, D., Wajszczyk, K. (2019) *Rozwiązywanie sytuacji konfliktowych. Wybrane problemy.* Warszawa. Difin
[3] Skarżyńska, K. (2007) *Konflikty międzygrupowe.* Warszawa, Wydawnictwo SWPS Academica

SECONDARY LITERATURE:

[4] Duhigg, Ch. (2016) *Mądrzej, szybciej, lepiej*
[5] Berne, E. (2004) *W co grają ludzie*

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Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish Trening kreatywności i technik twórczego myślenia
Name of subject in English Training of creativity and creative thinking techniques
Main field of study (if applicable): Business Engineering
Specialization (if applicable): Project Management
Profile: academic
Level and form of studies: 2nd level, full-time
Kind of subject: obligatory
Subject code W08IZZ-SM0024
Group of courses NO

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)					**30**
Number of hours of total student workload (CNPS)					**50**
Form of crediting					**crediting with grade**
For group of courses mark final course with (X)					
Number of ECTS points					**2**
including number of ECTS points for practical (P) classes					**2**
including number of ECTS points for direct teacher-student contact (BK) classes					**1,28**

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Basic knowledge in psychology.

SUBJECT OBJECTIVES

C1. The student acquires knowledge in the field of psychology of creativity and creative action as well as their individual, social and organizational determinants.
C2. Students know the methods and tools supporting the creativity of individual and group activities.
C3. Presentation of social, organizational and individual success factors in creative business.

SUBJECT LEARNING OUTCOMES

relating to knowledge:
PEU_W01 - Has knowledge of psychological mechanisms and factors favoring creativity.
PEU_W02 - Knows creativity and creativity models as well as success factors of the creative industry
relating to skills:

PEU_U01 Is able to independently prepare activities supporting creativity thinking and activities in a group and organization (creativity training).
relating to social competences:
PEU_K01 Is ready to search, select and create tools to raise the level of creativity in the team and organization.
PEU_K02 Is prepared to behave in a creative, professional and ethical manner; recognizes and formulates ethical dilemmas related to one's own and other people's creative work

Seminar		**Number of hours**
Sem 1	The importance of creativity in business - the creative industry	2
Sem 2	Theories of creative problem solving	2
Sem 3	Subjective and organizational barriers blocking creativity	2
Sem 4	Methods for measuring and stimulating creative thinking; individual characteristics of creators and entrepreneurs	2
Sem 5	Elements of creativity training - cooperation	2
Sem 6	Elements of creativity training - abstracting	2
Sem 7	Elements of creativity training - induction	2
Sem 8	Elements of creativity training - deduction	2
Sem 9	Elements of creativity training - metaphorisation	2
Sem 10	Elements of creativity training - transformation	2
Sem 11	Elements of creativity training - brainstroming	2
Sem 12	Presentation and analysis of student reports	2
Sem 13	Presentation and analysis of student reports	2
Sem 14	Presentation and analysis of student reports	2
Sem 15	Summary of classes and final grades	2
	Total hours	30

TEACHING TOOLS USED

N1. Lecture
N2. Group exercises
N3. Simulations
N4. Team work
N5. Discussion of problems and results of works
N6. Presentation of reports prepared by students

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming (during semester), P – concluding (at semester end)	Learning outcomes number	Way of evaluating learning outcomes achievement
F1	PEU_W01- PEU_W02 PEU_U01 PEU_K01-PEU_K02	Preparation of a part of creativity training
F2	PEU_W01- PEU_W02 PEU_U01 PEU_K01-PEU_K02	Analytical report

F3	PEU_W01- PEU_W02 PEU_U01 PEU_K01-PEU_K02	Activity during classes
C = 0,4 F1+ 0,4 F2 + 0,2 F3		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

Nęcka, E. (2012). *Psychologia twórczości*. Gdańsk: GWP

Nęcka, E. (2019). *Trening poznawczy*. Sopot. Smak słowa

Szymura, B. et al. (2019). *Trening twórczości*. Sopot. Smak słowa

Kosieradzka, A. (red.) (2015) *Metody i techniki pobudzania kreatywności w organizacji i zarządzaniu*

SECONDARY LITERATURE:

Duhigg, Ch. (2016) *Mądrzej, szybciej, lepiej.* Warszawa. PWN

Proctor, T. (2002). *Twórcze rozwiązywanie problemów*. Gdańsk: GWP

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Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish: Decyzje i podejmowanie ryzyka
Name of subject in English Decision and risk taking
Main field of study (if applicable): Business Engineering
Specialization (if applicable): Project management
Profile: academic
Level and form of studies: 2st, full time
Kind of subject: optional
Subject code W08IZZ-SM0025
Group of courses NO

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	**15**				**15**
Number of hours of total student workload (CNPS)	**25**				**25**
Form of crediting	Crediting with grade				Crediting with grade
For group of courses mark (X) final course					
Number of ECTS points	**1**				**1**
including number of ECTS points for practical classes (P)					**1**
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)	**0,68**				**0,68**

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1.
2.

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SUBJECT OBJECTIVES

C1 Acquisition of knowledge about the psychological mechanisms involved in making decision
C2 Knowing of situational and personality determinants of decision-making processes.
C3. Acquiring of knowledge in the scope of psychological approach to risk in decision-
C4 acquisition of skills identification of cognitive errors and distortions in decision-making and risk perception
C5 Mastering the skills of identifying manifestations of bounded rationality in decision-making and risk perception making
C6. Understanding the role of psychological factors and individual differences in decision-making and financial risk

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge

PEU_W01 student knows the nature and operation of psychological mechanisms of decision-making.
PEU_W02 he has knowledge of situational and personality determinants decision-making processes.
PEU_W03 he has knowledge of the psychological approach to risk in decision-making
relating to skills:
PEU_U01 He has ability to identify manifestations of bounded rationality in decision-making and risk perception
PEU_U02 He can be identified cognitive biases and distortions in the process of risk perception and decision-making
relating to social competence:
PEU_K01 he can determine the role of psychological factors and individual differences in risk and decision-making

PROGRAMME CONTENT		
Lecture		**Number of hours**
Lec1	Behavioral decision theory. Normative and descriptive models of decision-making and risk	2
Lec2	Model of bounded rationality in decision-making	2
Lec3	General dimensions of the decision. Dimensions decisions in the organization	2
Lec4	Cycles of information processing in the decision making process. Psychological decision rules..	2
Lec5	The role of heuristic in decision making (sources of biases and inclination in decision-making).	2
Lec6	The prospect theory in decision making processes	2
Lec7	Psychological aspects and determinant of risk assessment and decision-making	2
Lec8	The role of emotions in financial risk-taking	1
	Total hours	**15**

Seminar		**Number of hours**
Sem1	Decision-making models - phases. Rational and automatic processes in decision making.	2
Sem2	Cognitive processes in decision-making. Estimating of the subjective probability in decision-making	2
Sem3	Diagnostic heuristics in decision processes.. Types of cognitive biases and inclination.	2
Sem4	The consequences of prospect theory - biases in risk assessment - The effect of predisposition and the effect of sunk costs	2
Sem5	Rules of integrating alternatives in decision-making	2
Sem6	Quantitative and qualitative dimensions of perceived risk in decision-making	2
Sem7	Individual differences in decision-making and risk perception	2
Sem8	Sources of biases in financial risk estimation	1
	Total hours	**15**

TEACHING TOOLS USED
N1. Lecture N2. Multimedia presentations N3. Practical exercises N4. Problem lecture (stimulating questions and answers) N5 Own work

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
Lecture (P1) F1 – Test	PEU_W01 – PEU_W03	Test evaluation in scale 2 – 5.5
Seminar (P2) F2 Task	PEU_U01-PEU_U02 PEU_K01	Task evaluation
Seminar (P2) F3 test	PEU_W01 – PEU_W03	Test evaluation
P1 = F1; P2 = (F2 + F3)/2 - computed in percentage points (%), transformed into the scale 2-5.5		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Nosal C.S. (2001). Psychologia myślenia i działania menedżera., Wrocław, AKADE
[2] Kozielecki J. (1997). Psychologiczna teoria decyzji. Warszawa: PWN
[3] Tyszka, T., Zaleśkiewicz, T. (2001). Racjonalność decyzji. Pewność i ryzyko. Warszawa: Polskie Wydawnictwo Ekonomiczne.
[4] Tyszka, T. (1999). Pułapki oceniania i podejmowania decyzji. Gdańsk: GWP.
[5] Sokołowska, J. (2005). Psychologia decyzji ryzykownych. Ocena prawdopodobieństwa i modele wyboru w sytuacji ryzykownej. Podręcznik akademicki. Warszawa, Wydawnictwo Szkoły Wyższej Psychologii Społecznej – „Academica".
[6] Goszczyńska M., Studenski R. (red.) (2006). Psychologia zachowań ryzykownych koncepcje badania praktyka. Wydawnictwo: ŻAK

SECONDARY LITERATURE:

[1] Simon H., Podejmowanie decyzji kierowniczych, PWE, Warszawa 1982.
[2] Tyszka T., Analiza decyzyjna i psychologia decyzji, PWN, Warszawa 1986.
[3] Zaleśkiewicz, T. (2003). Psychologia inwestora giełdowego. Wprowadzenie do behawioralnych finansów. Gdańsk: Gdańskie Wydawnictwo Psychologiczne.
[4] Zaleśkiewicz, T. (2005). Przyjemność czy konieczność. Psychologia spostrzegania i podejmowania ryzyka. Gdańsk: Gdańskie Wydawnictwo Psychologiczne
[5] Sokołowska, J. (2000). Ryzyko: Wyzwanie czy zagrożenie. Psychologiczne modele oceny i akceptacji ryzyka. Warszawa: Wydawnictwo Instytutu Psychologii PAN.
[6] Lindsay P.H., Norman D.A. (1984). Procesy przetwarzania informacji u człowieka, Warszawa: PWN

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

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Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish Decyzje strategicznego przywództwa
Name of subject in English Strategic Decisions of leadership
Main field of study (if applicable): Business Engineering
Specialization (if applicable): Project Management
Profile: academic
Level and form of studies: 2nd level, full-time
Kind of subject: optional
Subject code W08IZZ-SM0026
Group of courses NO

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	**15**				**15**
Number of hours of total student workload (CNPS)	**25**				**25**
Form of crediting	**crediting with grade**				**crediting with grade**
For group of courses mark (X) final course					
Number of ECTS points	**1**				**1**
including number of ECTS points for practical classes (P)					**1**
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)	**0,68**				**0,68**

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Prerequisites: none.

SUBJECT OBJECTIVES

The aim of the course is to familiarize the participant with the skills that the leader should have in making strategic decisions.
C1. Acquiring knowledge in the field of effective team management
C2. Gaining knowledge in the field of effective communication with employees,
C3. Ability to solve organizational conflicts
C4. Gaining knowledge of modern methods and tools for making decisions

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:
PEU_W01 Demonstrate ordered knowledge of decision making methods and tools
PEU_W02 Demonstrate knowledge of how to manage a team
relating to skills:
PEU_U01 Has the skills to conduct creative discussions and solve problems

relating to social competences:
PEU_K01 Has the ability to work in a team

PROGRAMME CONTENT		
Lecture		**Number of hours**
Lec 1	Organizational environment and its impact on managerial decisions	2
Lec 2	Innovations as part of building a competitive advantage	2
Lec 3	Manager in the face of strategic challenges	2
Lec 4	Contemporary corporate strategies - case studies	2
Lec 5	The process of communication behavior in the organization	2
Lec6	Methods and tools for effective business decision making	2
Lec7	Sources of organizational conflicts and ways to resolve them	2
Lec 8	Case study	1
	Total hours	**15**

Seminar		**Number of hours**
Sem 1-2	Case study - managerial contract	4
Sem 3-4	Case study - organizational conflicts and its ways of solving	4
Sem 5-6	Case study - cooperation with a difficult business partner	4
Sem 7	Credit and discussion of results	1
	Total hours	**15**

TEACHING TOOLS USED
N1. Traditional lecture using media for multimedia presentations N2. consultations N3. Problem talk N4. Case studies.

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
F1	PEU_W01	Test
F2	PEU_W02 PEU_U01	Case study, active discussion
F3	PEU_K01	Case study, active discussion
P (lecture)= F1 P(Seminar) == 50%F2+50%F3		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Brzeziński M., Organizacja kreatywna, PWN Warszawa, 2009.

[2] Koźmiński A., Zarządzanie w warunkach niepewności, PWN Warszawa, 2011.

[3] Krawiec F., Kreowanie i zarządzanie reputacją firmy, Difin Warszawa, 2009.

[4] Penc J. Decyzje i zmiany w organizacji, PWN Warszawa, 2009.

SECONDARY LITERATURE:

[1] Obłój K., Strategie organizacji, PWE Warszawa, 2006.

[2] Zimniewicz K., Współczesne koncepcje i metody zarządzania, PWN Warszawa, 2011.

[3] Kuc B., Kontrola jako funkcja zarządzania, Difin Warszawa 2009.

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

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Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish: Psychologia przywództwa
Name of subject in English: Leadership psychology
Main field of study (if applicable): Business Engineering
Specialization (if applicable): Projects and Small Business Engineering
Profile: academic
Level and form of studies: 2nd level, full-time studies
Kind of subject: optional
Subject code W08IZZ-SM0027
Group of courses NO

	Lecture	Classes	Laboratory	Project	**Seminar**
Number of hours of organized classes in University (ZZU)	**15**				**15**
Number of hours of total student workload (CNPS)	**25**				**25**
Form of crediting	**crediting with grade**				**crediting with grade**
For group of courses mark (X) final course					
Number of ECTS points	**1**				**1**
including number of ECTS points for practical (P) classes					**1**
including number of ECTS points for direct teacher-student contact (BK) classes	**0,68**				**0,68**

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Basic knowledge of general psychology, i.e., mechanisms that guide thinking, decision-making and motivated human behavior
2. Ability to speak and write concisely.
3. Knowledge of presentation techniques.
4. Ability to work in groups.

SUBJECT OBJECTIVES

C1 To familiarize students with the psychological diagnosis of behavior and phenomena in the organization
C2 To communicate knowledge about career patterns and processes of their development
C3 To acquaint students with the importance of leadership in the organization and psychological processes in terms of predictors and consequences of leadership for the organization and employees
C4 To develop skills related to seeking and analyzing theoretical knowledge and empirical research, understanding the results of scientific research and effectively communicating the results of scientific research

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:
PEU_W01 Understands the role of the interaction of individuals and groups in a specific organizational context

relating to skills:
PEU_U01 Identifies factors contributing to the effectiveness of team management in the organization and is able to use them to design effective employee teams
PEU_U02 Is able to use psychological knowledge in managing people in project tasks as well as assume the role of a leader.
relating to social competences:
PEU_K01 Can convey his own views and stand up for them. Is prepared to persuade and negotiate for the sake of achieving common goals.
PEU_K02 Communicates effectively and empathetically with others, while respecting different perspectives and worldviews

PROGRAMME CONTENT		
Lectures		**Number of hours**
L 1	The importance of psychology in business. Introduction.	1
L 2	Psychological determinants of individual functioning in organization: personality, temperament, and cognitive abilities	2
L 3	Mechanisms of work motivation	2
L 4	Psychological aspects of organizational commitment, engagement, and job satisfaction	2
L 5	Psychosocial resources and job demands	2
L 6	Dysfunctional characteristics and behavior of employees	2
L 7	Leadership as employees' support system	2
L 8	Moral and ethical behavior/ final test	2
	Total hours	**15**

Seminar		**Number of hours**
Se 1	Analysis of the organization as an interactive system of mutual interactions between employees and the organization - psychological perspective	1
Se 2	Individual differences of employees and their fit to the profession	2
Se 3	Psychosocial resources and ability to meet job demands	2
Se 4	Job attitudes and work satisfaction as determinants of work engagement	2
Se 5	Psychological determinants of communication	2
Se 6	Decision making and creativity	2
Se 7	Employees well-being: health, stress, and stress-coping	2
Se 8	Psychological and organizational determinants of differences between leaders and managers. Summary of the course	
	Total hours	**15**

TEACHING TOOLS USED
N1. Interactive Lecture N2. Multimedia presentations N3. Moderated discussions N4. Tasks and simulations

EVALUATION OF SUBJECT EDUCATIONAL EFFECTS ACHIEVEMENT

Evaluation (F – forming (during semester), P – concluding (at semester end)	Educational effect number	Way of evaluating educational effect achievement
F1 Test	PEU_W01	Test of knowledge
F2 Student's work	PEU_U02	Assessment of the practical and formal value of the task.
F3 Case study	PEU_01	Assessment of the practical and formal value of the case study
F4 Student's participation	PEU_K01 PEU_K02	Assessment of student's participation in classes and group taks
P (lecture): F1 **P2 (seminar)** F2*0.4 + F3*04 + F4*0.2		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Gayle, A. C. (2016). Przywództwo w organizacji. Paradygmaty i studia przypadków. Warszawa: PWE

[2] Fortuna, P., Rożnowski, B. (2020). *Psychologia Biznesu* (eBook). Warszawa: PWN

[3] Babiak, J. Bajcar, B. Borkowska, A. (2017). Kobiety i mężczyźni na stanowiskach menedżerskich – wyolbrzymione czy niedoszacowane różnice? *Zarządzanie Zespołami Ludzkimi*, 1.

SECONDARY LITERATURE:

[4] Czarnota-Bojarska, J. (2010). Dopasowanie człowiek-organizacja i tożsamość organizacyjna. Warszawa: Wydawnictwo Naukowe Scholar.

[5] Hornowska, E., Paluchowski W. J. (2007). *Praca – skrywana obsesja. Wyniki badań nad zjawiskiem pracoholizmu.* Poznań: Bogucki Wydawnictwo Naukowe

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

JOLANTA BABIAK **jolanta.babiak@pwr.edu.pl**

Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish Fizyka Techniczna Środowiska Pracy
Name of subject in English Technical Physics of Work Environment
Main field of study (if applicable): Business Engineering
Specialization (if applicable): Project Management
Profile: practical
Level and form of studies: 2nd level, full-time
Kind of subject: optional
Subject code W08IZZ-SM0028
Group of courses NO

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)				**30**	
Number of hours of total student workload (CNPS)				**50**	
Form of crediting				**Crediting with grade**	
For group of courses mark (X) final course					
Number of ECTS points				**2**	
including number of ECTS points for practical classes (P)				**2**	
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)				**1,36**	

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Intermediate computer skills (text editing and processing, spreadsheets handling, basics in raster graphics editing)
2. Passing the Physics course or its equivalent at the 1st level

SUBJECT OBJECTIVES

C1 Possessing practical skills in using methods and tools for measuring physical factors of workplace environment and in evaluation of their impact on the employee.
C2 Possessing practical skills in using ergonomic methods and tools for fitting working conditions to human requirements, needs and limitations.

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:

PEU_W01: Understanding the difference between the objective and subjective approach to the problem of measuring and evaluating the impact of the physical environment on the employee.

PEU_W02: Possessing the knowledge that enables an accurate selection of methods and tools needed to perform a comprehensive assessment of working conditions in a given workplace.

relating to skills:

PEU_U01: Ability to measure selected factors of the physical work environment, to interpret their results in the context of their impact on the employee, and to formulate recommendations that will improve her/his well-being.

PEU_U02: Ability to assess the existing level of working conditions ergonomic fitting and to indicate the direction and details of changes of a technical nature, aimed at their improvement.

relating to social competences:

PEU_K01: The student can communicate in a language that is clear and understandable for a non-engineer his recommendations related to the physical environment and working conditions.

PEU_K02: The student can use the potential of group work, actively participating in the division of tasks and their timely execution.

PROGRAMME CONTENT

Project		**Number of hours**
Proj 1	Course introduction. Explanation of the passing rules and conditions.	1
Proj 2	Measurements of work environment physical factors - technical aspects overview.	2
Proj 3	Measurements of light intensity, noise levels and basic microclimate parameters.	3
Proj 4	The specificity of work performed and the working posture of the body. Postural load.	1
Proj 5	Adjusting the height of the horizontal working surface to the type of work, size and weight of objects and tools used.	2
Proj 6	Selection and ergonomic evaluation of the seating device intended for work of a given nature.	2
Proj 7	Nuisance of work - factors and assessment methods overview.	2
Proj 8	Assessment of the static load magnitude and the level of monotypic work activities.	2
Proj 9	The influence of the microclimate on the employee – current used models overview.	2
Proj 10	Determining the range of values of microclimatic parameters that enable comfortable performance of work with a given level of physical effort.	2
Proj 11	Noise in the workplace. Organizational methods of reducing noise exposure.	2
Proj 12	Optimizing the position of noise sources and workstations; using barriers and sound-absorbing systems to reduce noise exposure.	2

Proj 13	Optimizing the layout of items and tools at the workplace with respect to the order and frequency of their use.	3
Proj 14	Subjective assessment of the impact of the physical environment and working conditions on the employee - methods and tools overview.	2
Proj 15	Measurements of work-related fatigue as perceived by the employee.	2
	Total hours	30

TEACHING TOOLS USED
N1. Materials and instructions available on the website http://ergonomia.ioz.pwr.wroc.pl/ and on the ePortal. N2. The student's own work, including preparation for small exams. N3. Consultations.

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
F1	PEU_W01 PEU_W02	Arithmetic mean of individual grades from small exams (4 topics chosen by the teacher, announced each time during the classes).
F2	PEU_U01 PEU_U02 PEU_K01 PEU_K02	Grade for a project in the form of a written and illustrated document carried out in a group (three or - in special cases, e.g. the size of a class – two students), discussed in stages with the teacher during the semester, with an explicit division of the work done by individual group members.
P=0,5*F1+0,5*F2		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Górska E., Ergonomia. Projektowanie, diagnoza, eksperymenty, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2015
[2] Tytyk E., Projektowanie ergonomiczne, Wydawnictwo Naukowe PWN, Warszawa 2001
[3] Wykowska M., Ergonomia jako nauka stosowana, Uczelniane Wydawnictwa Naukowo-Dydaktyczne AGH, Kraków 2009

SECONDARY LITERATURE:

[1] Grandjean E., Fitting the task to the man. An ergonomic approach, Taylor & Francis, London 1980
[2] Młodkowski J., Aktywność wizualna człowieka, Wydawnictwo Naukowe PWN, Warszawa 1998
[3] Ozimek E., Dźwięk i jego percepcja. Aspekty fizyczne i psychoakustyczne, Wydawnictwo Naukowe PWN, Warszawa 2002
[4] Proctor R.W., Van Zandt T., Human factors in simple and complex systems. Second edition, CRC Press 2008
[5] Śliwowski L., Mikroklimat wnętrz i komfort cieplny ludzi w pomieszczeniach, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2000

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

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Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish: Fizyka układów złożonych
Name of subject in English: Physics of complex systems
Main field of study (if applicable): Inżynieria zarządzania
Specialization (if applicable): Zarządzanie projektami
Profile: academic
Level and form of studies: 2nd level full-time
Kind of subject: elective
Subject code W08IZZ-SM0029
Group of courses NO

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	**15**		**15**		
Number of hours of total student workload (CNPS)	**25**		**25**		
Form of crediting	**crediting with grade**		**crediting with grade**		
For group of courses mark (X) final course					
Number of ECTS points	**1**		**1**		
including number of ECTS points for practical classes (P)			**1**		
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)	**0,68**		**0,68**		

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Programming skills for example in Python
2. Knowledge of elements of probability and statistics, and skills related to this subject
3. Elementary knowledge of calculus, algebra and general physics from 1st level technical studies

SUBJECT OBJECTIVES

C1 The purpose of this introductory course is to give an overview of the basic concepts, models and tools, used in the field of the Complex Systems, i.e. systems of many interacting components. After this course students should understand the essence of complexity and relations between different approaches used for complex systems.

SUBJECT EDUCATIONAL EFFECTS

Related to knowledge:
PEU_W01: He knows and understands advanced models, methods and IT tools, especially simulation tools used to solve management decision-making problems.
In the field of skills:
PEU_U01: Can describe selected issues encountered in everyday and professional life using mathematical and physical formalism and draw conclusions
In the field of social competences:
PEU_K01: Is able to take an active part in discussions and work in a group

PROGRAMME CONTENT		
Lecture		**Number of hours**
Lec 1	Presentation of the requirements and grading. Introduction: what is a Complex system and how it can be modeled?	1
Lec 2	From mikro to makro: Equilibrium, Entropy, Ehrenfest model	2
Lec 3	Percolation model	2
Lec 4	Ising Model	2
Lec 5	Elements of phase transitions theory	2
Lec 6	Complex networks: models and processes on networks	2
Lec 7	Power laws around us and models of self-organized criticality	2
Lec 8	Social complex systems: models of opinion dynamics and diffusion of innovation	2
	Total hours	15

Laboratory		**Number of hours**
Lab 1	Presentation of the requirements and grading.	1
Lab 2	Monte Carlo Simulations	3
Lab 3	Simulation of the Percolation model	4
Lab 4	Metropolis Monte Carlo simulation of the Ising model	4
Lab 5	Complex networks: models and visualization (NetworkX package for Python)	3
	Total hours	15

TEACHING TOOLS USED
N1. Traditional lecture N2. Multimedia presentation N3. Computer laboratory – PC computer with Python.

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
F1	PEU_W01	Test (Lec 7)
F2	PEU_U01 PEU_K01	The average grade from lab assignments
P(Lecture)=F1		
P(Laboratory)=F2		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

1.Albert-László Barabási, “Network Science”, Cambridge University Press 2016

2. Nino Boccara, “Modeling Complex Systems”, 2nd Edition, Springer-Verlag New York Inc. 2010

3. Nicholas R. Moloney, Kim Christensen, “Complexity and Criticality”, Imperial College Press 2005

SECONDARY LITERATURE:

1. David P. Landau, Kurt Binder, “A Guide to Monte Carlo Simulations in Statistical Physics”, 4th Edition, Cambridge University Press 2014
2. Mark Newman, “Networks: An Introduction”, Oxford University Press 2010
3. Stefan Thurner, Rudolf Hanel, and Peter Klimek, “Introduction to the Theory of Complex Systems”, Oxford University Press 2018
4. Mark E. J. Newman, G. T. Barkema, “Monte Carlo Methods in Statistical Physics”, Oxford University Press 1999

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

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Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish: Zarządzanie projektami – studia przypadku
Name of subject in English: Project management - case studies
Main field of study (if applicable): Business Engineering
Specialization (if applicable): Project Management
Level and form of studies: 2nd level, full-time
Kind of subject: obligatory
Subject code: W08IZZ-SM0065
Group of courses: YES

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)				15	30
Number of hours of total student workload (CNPS)					50
Form of crediting					Crediting with grade
For group of courses mark (X) final course					X
Number of ECTS points					2
including number of ECTS points for practical classes (P)					2
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)					1,96

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Knowledge of project management fundamentals.

SUBJECT OBJECTIVES

C1 To provide students with knowledge about advanced methods and approaches to managing projects of various types (business, IT, social, public, scientific, etc.).
C2. To develop a critical and creative approach to managing projects of various types (business, IT, social, public, scientific, etc.).
C3. To develop teamwork skills.

SUBJECT LEARNING OUTCOMES

relating to knowledge:
PEU_W01 The student has knowledge of advanced methods and approaches for managing projects of various types (business, IT, social, public, scientific, etc.)
relating to skills:
PEU_U01: The student is able to analyze and solve problems occurring in the management of various types of projects (business, IT, social, public, scientific, etc.).
PEU_U02: The student is able to apply advanced methods and approaches of project management to solve problems that have occurred.

PEU_U03: The student is able to work in a team, using the knowledge of project management.
relating to social competences:
PEU_K01: The student is aware of the importance of managing various types of projects (business, IT, social, public, scientific, etc.)
PEU_K02: The student develops the ability to work in a team and the ability to develop a collaborative opinion when analyzing project case studies and is able to justify his/her position.

PROGRAMME CONTENT		
Seminar		**Number of hours**
Se 1	Introduction	2
Se 2 – Se 3	Case studies: business projects	4
Se 4 – Se 5	Case studies: social projects	4
Se 6 – Se 7	Case studies: public projects	4
Se 8 – Se 9	Case studies: scientific projects	4
Se 10 – Se 11	Case studies: IT projects	4
Se 12 – Se 13	Case studies: event organisation projects	4
Se 14 – Se 15	Summary	4
	Total hours	**30**

Seminar		**Number of hours**
Pr 1	Introduction	1
Pr 2-Pr 3	Project initiation phase - case study	4
Pr 4-Pr 5	Project planning phase - case study	4
Pr 6	Project implementation and monitoring phase - case study	2
Pr 7	Project closure phase - case study	2
Pr 8	Summary	2
	Total hours	**15**

TEACHING TOOLS USED
N1. Case study analysis. N2. Discussion of selected problems. N3. Presentation prepared by students. N4. Using of software supporting project management.

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement

F1	PEU_W01, PEU_U01, PEU_U02, PEU_U03	Assessment of how case studies are analyzed and evaluating the proposed solutions.
F2	PEU_K01, PEU_K02	Assessment of activity during teamwork in the course.
F3	PEU_U03, PEU_K02	Assessment of how case studies are analyzed and evaluating the proposed solutions.

P=40%*F3 + 60%(0,7*F1+0,3*F2)

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] PMI (2021), Project Management Body of Knowledge, 7th edition, Project Management Institute
[2] Kerzner H. (2005), Advanced Project Management, Edycja Polska, Wyd. Helion
[3] Cobb Ch. G. (2012), Zrozumieć Agile Project Management, Wyd. Promise

SECONDARY LITERATURE:

[1] Trocki M. (2017), Metodyki i standardy zarządzania projektami, Polskie Wydawnictwo Ekonomiczne
[2] Gray C.F., Larson E.W., Desai G.V. (2013), Project Management, Wyd. MCGraw Hill
[3] Kerzner H. (2006). Project Management. Case studies, Wyd. John Wiley & Sons
[4] PMI (2017), Agile Practice Guide, Project Management Institute
[5] PMI (2021), Project Management Body of Knowledge 7th edition, Project Management Institute
[6] Strona internetowa International Project Management Association Polska: https://ipma.pl/
[7] Wilczewski S., MS Project 2013 i MS Project Server 2013. Efektywne zarządzanie projektem i portfelem projektów (ebook), Helion

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

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dr inż. Joanna Iwko, joanna.iwko@pwr.edu.pl

Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish Zintegrowane systemy informatyczne zarządzania
Name of subject in English Integrated Management Information Systems
Main field of study (if applicable): Business Engineering
Specialization (if applicable): Project Management
Profile: academic
Level and form of studies: 2nd level, full-time
Kind of subject: obligatory
Subject code W08IZZ-SM0066
Group of courses YES

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	**15**		**15**		
Number of hours of total student workload (CNPS)	**50**				
Form of crediting	**crediting with grade**				
For group of courses mark final course with (X)	**X**				
Number of ECTS points	**2**				
including number of ECTS points for practical (P) classes	**1**				
including number of ECTS points for direct teacher-student contact (BK) classes	**1,36**				

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Fundamentals of databases.
2. Fundamentals of management information systems

SUBJECT OBJECTIVES

C1 Familiarizing students with basic integrated management information systems issues.
C2 Familiarizing students in practice with specific integrated management information systems.

SUBJECT LEARNING OUTCOMES

relating to knowledge:

PEU_W01 Student has the knowledge about the different classes of integrated management information systems.
PEU_W02 Student knows the main modules of integrated management information systems and their functionalities.
PEU_W03 Student knows the basic rules of integrated management information systems selection and implementation.
PEU_W04 Student knows the current technologies and the prospects of integrated management information systems development.

relating to skills:

PEU_U01 Student can determine the objectives of integrated management information system implementation for specific organization.
PEU_U02 Student is able to perform an analysis of a given integrated management information system functionality.
PEU_U03 Student can use an exemplary system to a limited extent.
relating to social competences:
PEU_K01 Student understands the importance of business requirements in integrated management information systems selection and implementation

PROGRAM CONTENT		
Lectures		**Number of hours**
Lec 1	Presentation of subject and rules of crediting. Management information systems.	1
Lec 2	The reasons and goals of the integrated management information system implementation. The modules characteristics.	2
Lec 3	The modules characteristics (continuation)	2
Lec 4	Integrated management information system designing.	2
Lec 5	The rules of integrated management information system selection and implementation.	2
Lec 6	Integrated management information systems prospects of development. New technologies.	2
Lec 7	The market of integrated management information system in Poland and in the world. The examples of implementation.Test.	2
Lec 8	The students presentation of integrated management information system (possibility). Retake.	2
	Total hours	15

Laboratory		**Number of hours**
Lab 1	Introduction, rules of crediting.	1
Lab 2	Presentation of a system. Introduction to its operation and parametrisation.	2
Lab 3	Work with the HR module.	2
Lab 4	Work with the financial module.	2
Lab 5	Work with the logistic module.	2
Lab 6	Work with the manufacturing module.	2
Lab 7	Work with the other modules.	2
Lab 8	Evaluation of the system expertise.	2
	Total hours	15

TEACHING TOOLS USED
N1. Traditional lecture with Power Point presentations and videos. N2.Case studies.

N3. Familiarization with exemplary integrated management information system based on training materials.

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming (during semester), P – concluding (at semester end)	Learning outcomes number	Way of evaluating learning outcomes achievement
F1 (lecture)	PEU_W01-W04 PEU_U01-U02 PEU_K01	Test
F2 (laboratory)		Test
F3 (laboratory)	PEU_W02 PEU_U01-U03 PEU_K01	Crediting (work with the system)
P(Lect)=F1 P(Lab)=0.6*F2+0.4*F3 P=0,5*P(Lect)+0,5*P(Lab)		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

1. Banaszak Zb., Kłos S., Mleczko J.: Zintegrowane systemy zarządzania. PWE, Warszawa 2016.
2. Bytniewski A. (red): Architektura zintegrowanego systemu zarządzania Wydawnictw Akademii Ekonomicznej we :Wrocławiu, Wrocław 2015.
3. Gospodarek T.: Systemy ERP. Modelowanie, projektowanie, wdrażanie. Helion. Gliwice 2015.

SECONDARY LITERATURE:

1. Tubis A., Brzezińska P., Jakubiak M.: Systemy MRP/ERP. Biblioteka Międzynarodowej Wyższej Szkoły Logistyki i Transportu we Wrocławiu, Wrocław 2016.
2. Informatyka ekonomiczna. Teoria i zastosowania. Praca zbiorowa. Wydawnictwo Naukowe PWN. Warszawa 2019.
3. Educational materials and systems suppliers' websites

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

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Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish Zrównoważone zarządzanie projektami
Name of subject in English Sustainable project management
Main field of study (if applicable): Engineering Management
Specialization (if applicable): Project Management
Profile: academic
Level and form of studies: 2nd level, full-time
Kind of subject: obligatory
Subject code W08IZZ-SM0067
Group of courses YES

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	**15**	**15**			
Number of hours of total student workload (CNPS)	**25**	**25**			
Form of crediting	**crediting with grade**				
For group of courses mark (X) final course	**x**				
Number of ECTS points	**2**				
including number of ECTS points for practical classes (P)	**1**				
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)	**1,36**				

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. knowledge of project management processes, ability to initiate, plan, execute, control and close a project

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SUBJECT OBJECTIVES

C1 To familiarize the student with the topic of sustainable project management, including the PRISM methodology and the P5 standard

C2 To raise the student's awareness of global challenges with particular reference to environmental, social and economic challenges affecting project management

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:

PEU_W01 Student knows and understands the approach to sustainable project management

relating to skills:
PEU_U01 Students is able to analyze the environmental, economic and social impact of the project

relating to social competences:
PEU_K01 Student is able to discuss problems related to sustainable project management and reach a compromise solution in a small group

PROGRAMME CONTENT		
Lecture		**Number of hours**
Lec 1	Introduction	1
Lec 2	Essence of sustainability (including sustainability goals)	2
Lec 3-4	Sustainability and projects (including the P5 Standard)	4
Lec 5-6	PRISM methodology	4
Lec 7	Standards to support sustainable projects, project management governance standards	2
Lec 8	Test	2
	Total hours	**15**

Classes		**Number of hours**
Cl 1	Introductory class: introduction to the principles of work and course credit, division into student groups	1
Cl 2	Sustainable development goals (exercise 3.5), Long-term perspective in sustainable project management (exercise 4.1)	2
Cl 3	Case study analysis (exercise 4.2), Project charter (exercise 4.4)	2
Cl 4	Project life cycle in PRISM (exercise 5.1), KPIs in sustainable project management (exercise 5.3)	2
Cl 5	P5 impact analysis: environment - exercise 7.2, society - exercise 7.1, economics - exercise 7.3	4
Cl 6	Sustainable project management (SPM) plan	2
Cl 7	Summary, grading	2
	Total hours	**15**

TEACHING TOOLS USED
N1. Theoretical lecture N2. Exercise workshop N3. Case studies

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
F1	PEU_W01 PEU_U01	Test
F2	PEU_W01 PEU_U01 PEU_K01	Evaluation of students' teamwork during exercise workshops
P = 0,5*F1+0,5*F2		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] J. Carboni, W. Duncan, M. Gonzales, P. Milsom, M. Young, Zrównoważone zarządzanie projektami. Podręcznik GPM, I wydanie w języku polskim, pm2pm sp. z o.o. Kraków 2020

[2] GPM Standard P5 na rzecz Zrównoważonego Zarządzania Projektami, wersja 2.0, Standard P5 - GPM EMEA (gpm-emea.org)

SECONDARY LITERATURE:

[1] A. Brzozowska, A. Pabian, B. Pabian, Sustainability in Project Management. A Functional Approach, 1st Edition, CRC Press, Taylor&Francis Group, 2021

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

dr hab. inż. Agata Klaus-Rosińska, prof. uczelni

Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish:	**Praca dyplomowa**
Name of subject in English:	**Diploma Thesis**
Main field of study:	**Business Engineering**
Specialization:	**Project Management**
Profile:	**academic**
Level and form of studies:	**2nd level, full-time**
Kind of subject:	**obligatory**
Subject code:	**W08IZZ-SM0068**
Group of courses:	**NO**

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)					**12**
Number of hours of total student workload (CNPS)					**350**
Form of crediting					**crediting with grade**
For group of courses mark (X) final course					
Number of ECTS points					**14**
including number of ECTS points for practical classes (P)					**14**
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)					**3,48**

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1 Cross-cutting knowledge of issues in the course of study

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SUBJECT OBJECTIVES

C1 To synthesize knowledge from the entire course of study and practical skills, especially in the field of the selected specialization.
C2 To consolidate skills of acquiring and using scientific and technical information.
C3 To achieve proficiency in diagnosing management systems and designing solutions to managerial problems.
C4 To develop in a compact form a work (diploma thesis) on the basis of knowledge gained during studies, literature information, analytical and design work, including the results of research work.

SUBJECT EDUCATIONAL EFFECTS

relating to skills:
PEU_U01 Is able to make in-depth analysis of working or designed process in organization or phenomena and systems in the field of management and indicate dysfunctions and/or needs for improvement.
PEU_U02 Can gather and analyze information from various sources in the field of management.

PEU_U03 Can correctly indicate, select and apply basic methods, techniques and tools to solve a managerial problem.
PEU_U04 Can correctly identify a managerial problem and plan its solution using appropriate methods, techniques and tools, as well as guide others in the training and implementation of proposed solutions.
PEU_U05 Can prepare a professional work - a comprehensive text presenting in a rigorous way the results of analytical, design and research work.

PROGRAMME CONTENT

Project		Number of hours
Sem1	Analysis of the organization (or phenomenon, system) that is the subject of the paper. Identification, analysis of the problem and assumptions, research theses.	1
Sem 2	In-depth literature analysis of issues addressed in the thesis, including methods, techniques, and tools used to solve problems of a particular class.	2
Sem 3	Analytical and research work.	6
Sem 4	The analysis of the results obtained, of the feasibility and desirability of their implementation, of the schedule, of the expected effects and economics.	1
Sem 5	To determine the direction of future work on the issue included in the scope of the thesis.	1
Sem 6	Thesis Editing	1
	Total hours	12

TEACHING TOOLS USED

N1. Literature study.
N2. Interviews with employees of the organization that is the subject of the study.
N3. Research methods appropriate to the topic of the work, e.g. surveys.
N4. Own analytical and creative work.
N5. Individual consultations.

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
F1	PEU_U01-PEU_U05	Ongoing evaluation of systematic work and partial performance.
F2	PEU_U01-PEU_U05	Final evaluation of the finished work (thesis).
P = 0,5*F1 + 0,5*F2		

PRIMARY AND SECONDARY LITERATURE
PRIMARY LITERATURE: Literature related to the problems of the thesis - independently selected and recommended by the thesis supervisor.
SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)
Name.ForenameOfSupervisor@pwr.edu.pl

SUBJECT CARDS

SPECIALIZATION:
BUSINESS INTELLIGENCE

Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish Marketing cyfrowy i media społecznościowe
Name of subject in English: Digital Marketing and Social Media
Main field of study (if applicable): Business Engineering
Specialization (if applicable): Business Intelligence
Profile: academic
Level and form of studies: 2nd level studies, full-time
Kind of subject: obligatory
Subject code: W08IZZ-SM8009
Group of courses: Yes

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	**15**		**15**	**30**	
Number of hours of total student workload (CNPS)	**25**		**25**	**50**	
Form of crediting	**crediting with grade**		**crediting with grade**	**crediting with grade**	
For group of courses mark (X) final course				**X**	
Number of ECTS points				**4**	
including number of ECTS points for practical classes (P)				**3**	
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)				**2,64**	

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Student has basic knowledge of using computer and internet applications.
2. Student has profiles on various social media platforms such as Facebook, LinkedIn, Twitter, Instagram (optional)

SUBJECT OBJECTIVES

C1 To provide students with an understanding of the strategic and tactical issues of digital marketing and social media.
C2 To equip students with professional, intellectual and key transferable skills consistent with professional standards in online marketing.
C3 To equip students with the ability to learn and work autonomously in the pursuit of creative and digital strategies and business solutions.

SUBJECT EDUCATIONAL EFFECTS

Relating to Knowldege:

PEU_W01: Relevant knowledge of digital marketing and social media, its associated technologies, its management, and the ecosystem in which it is applied and managed.

PEU_W02: Understanding of tools and techniques which are sufficient to allow comprehensive investigation into relevant digital marketing and social media related issues.

Relating to skill:

PEU_U01: Ability to make effective use of digital and social media for business marketing.

PEU_U02: Ability to adapt and demonstrate originality, insight and critical and reflective skills so as to make informed decisions in dynamic online environment.

PEU_U03: Ability to communicate effectively both orally and in writing, using a range of media

PROGRAMME CONTENT		
Lecture		**No. of hours**
Lec 1	Introduction to the course, requirements, and evaluation	1
Lec 2	Landscape of digital marketing and social media	2
Lec 3	Digital marketing strategies and campaigns	2
Lec 4	Digital media and marketing mix	2
Lec 5	Search Engine Optimization and Search Engine Marketing	2
Lec 6	Social media marketing and relationship marketing using digital platforms	2
Lec 7	Social media marketing strategy	2
Lec 8	Social media analytics	2
	Total hours	15
Laboratory		**No. of hours**
Lab 1	Laboratory rules, regulations and introduction to platforms to be used	1
Lab 2	Acquainting with digital marketing and social media platforms	2
Lab 3	Creating digital marketing strategies and campaigns	2
Lab 4		2
Lab 5	Google Analytics and Advertising	2
Lab 6	Creating social media marketing strategies and campaigns	2
Lab 7	Creating content for digital and social media	2
Lab 8		2
Total hours		**15**
Project		**No. of hours**
Proj 1	Discussion on the project outline and selecting a business (real or imaginary)	2

Proj 2	Creating a comprehensive digital marketing strategy	10
Proj 3	Creating a comprehensive social media marketing strategy	10
Proj 4	Creating content for implementation of the strategies	6
Proj 5	Final presentations and group discussion **Total hours**	2 **30**

TEACHING TOOLS USED

N1 Lecture information
N2 Multimedia presentation
N3 Flipped classroom
N4 Demonstrations
N5 Collaboration and group discussion
N6 Team work on Microsoft Teams or similar team work software/web-platform
N7 Documentation and debriefing
N8 Group feedback

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
F1	PEU_W01, PEU_W02	Lab Tasks
F2	PEU_W01, PEU_W02, PEU_U01, PEU_U02, PEU_U03	Final Report & Presentation

P = F1 * 30% + F2 * 70%
To pass the course a student is required to collect at least 50% in each F1 and F2 respectively.
(3 from 50%, 3.5 from 60%, 4.0 from 70%, 4.5 from 80%, 5.0 from 90%, 5.5 from 99%)

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

i) Chaffey, Dave, and Fiona Ellis-Chadwick. Digital marketing. Pearson UK, 2019.
ii) Tuten, Tracy L. Social media marketing. Sage, 2020.

SECONDARY LITERATURE:

i) Hanlon, Annmarie. Digital marketing: Strategic planning & integration. Sage, 2018.
ii) West, Douglas C., John Battice Ford, and Essam Ibrahim. Strategic marketing: creating competitive advantage. Oxford University Press, USA, 2015.
iii) Heinze, Aleksej, et al., eds. Digital and social media marketing: a results-driven approach. Routledge, 2020.
iv) Chawla, Yash, and Grzegorz Chodak. Social media marketing for businesses: organic promotions of web-links on Facebook. Journal of Business Research. 2021, vol. 135, pp. 49-65. https://dx.doi.org/10.1016/j.jbusres.2021.06.020

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Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish: Gry i decyzje w zarządzaniu
Name of subject in English: Games and decisions in management
Main field of study (if applicable): Business Engineering
Specialization (if applicable): Business Intelligence
Profile: academic
Level and form of studies: 2nd level, full-time
Kind of subject: obligatory
Subject code: W08IZZ-SM8012
Group of courses: NO

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	**30**		**30**		
Number of hours of total student workload (CNPS)	**50**		**50**		
Form of crediting	**Crediting with grade**		**Crediting with grade**		
For group of courses mark (X) final course					
Number of ECTS points	**2**		**2**		
including number of ECTS points for practical classes (P)			**2**		
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)	**1,28**		**1,28**		

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Basic knowledge of probability calculus
2. Basic skills in computer programming

SUBJECT OBJECTIVES

C1 Presenting various decision-making models, involving one or more persons, under risk or uncertainty.
C2 Showing applications of decision theory and game theory in management.
C3 Presenting methods of computing solutions to various decision-making models.

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:
PEU_W01 Students have in-depth knowledge of various decision-making models, involving game-theory models and robust/stochastic optimization.

relating to skills:
PEU_U01 Student can apply decision-making models to practical situations.
PEU_U02 Student can compute and interpret a solution to basic decision-making models.

PROGRAMME CONTENT		
Lecture		**Number of hours**
Lec 1	Classification of decision problems.	2
Lec 2	Modeling of risk and uncertainty in optimization problems.	2
Lec 3	Elements of stochastic and robust optimization with application to portfolio selection problem.	2
Lec 4	Games in extensive and normal form.	2
Lec 5	Equilibria in non-cooperative games.	2
Lec 6	Zero-sum games. Solving zero-sum games by using linear programming.	2
Lec 7	Applications on noncooperative *n*-person games.	2
Lec 8	Games with communications. Correlated equilibria.	2
Lec 9	Two-person bargaining problem. Nash solution concept.	2
Lec 10	Games in coalitional form. The concept of the core.	2
Lec 11	The Shapley value.	2
Lec 12	Decision making under risk – von Neumann and Morgenstern utility theory.	2
Lec 13	Decision making under uncertainty.	2
Lec 14	Group decision making. The Arrow's paradox.	2
Lec 15	Written test	2
	Total hours	**30**

Laboratory		**Number of hours**
Lab 1-2	Solving deterministic optimization problems using AMPL language.	4
Lab 3-5	Solving stochastic and robust optimization problems using AMPL language.	6
Lab 6	Solving zero-sum games using AMPL language.	2
Lab 7-10	Solving non-cooperative games.	8
Lab 11-12	Solving cooperative games.	4
Lab 13-14	Solving decision problems under risk and uncertainty.	4
Lab 15	Written test.	2
	Total hours	**30**

TEACHING TOOLS USED
N1. Presentation N2. List of tasks N3. Mathematical programming languages and software tools for game theory

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes	Way of evaluating learning outcomes achievement
F1	PEU_W01	Written test
F2	PEU_U01 PEU_U02	Solving tasks during classes (activity during classes)
F3	PEU_U01 PEU_U02	Written test using computer software.
P (Lecture) = F1 P (Laboratory) = 0.2 F2 + 0.8 F3		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

1. R. D. Luce, H. Raiffa. Games and decisions. Introduction and critical survey. Dover Publication Inc. 1957.
2. E. Prisner. Game theory through examples. MAA 2014.
3. P. Kall, J. Mayer. Stochastic linear programming. Models, theory and computation. International Series in Operations Research and Management Science. Springer 2011

SECONDARY LITERATURE:

1. R. Myerson. Game Theory: Analysis of conflict, Harvard University Press, 1997
2. H. Peters. Game Theory. A multi-level approach. Springer 2008
3. N. Nisan, T. Roughgarden, E. Tardos, V. Vazirani (eds.). Algorithmic game theory. Cambridge University Press 2007

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

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Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish: Analityka predykcyjna
Name of subject in English: Predictive analytics
Main field of study (if applicable): Business Engineering
Specialization (if applicable): Business Intelligence
Profile: academic
Level and form of studies: 2nd level, full-time
Kind of subject: obligatory
Subject code W08IZZ-SM8013
Group of courses YES

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	**30**		**30**		
Number of hours of total student workload (CNPS)	**75**		**75**		
Form of crediting	**Exam**				
For group of courses mark (X) final course	**X**				
Number of ECTS points	**6**				
including number of ECTS points for practical classes (P)	**3**				
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)	**2,64**				

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Programming skills in Julia, Matlab / Octave, R or Python environments
2. Knowledge of the basics of probability theory and mathematical statistics

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SUBJECT OBJECTIVES

C1: Acquiring knowledge about forecasting and the ability to apply it in business practice

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:
PEU_W01 Knows advanced forecasting methods. Has an in-depth knowledge of selected linear and non-linear forecasting techniques for decision support in a changing or uncertain environment.

Relating to skills:
PEU_U01 Is able to choose the right forecasting method and build a forecasting model. Can assess the quality of forecasts. Can use forecasting techniques to solve complex management decision problems.

Relating to social competences:
PEU_K01 Is aware of the need for independent, critical assessment of the scope and level of knowledge

in the field of predictive analytics. Is prepared to independently search for knowledge in this area.

PROGRAMME CONTENT		
Lecture		**Number of hours**
Lec 1	Introduction to the course. Back to school: Naïve predictions	2
Lec 2-3	Exponential smoothing	4
Lec 4-5	Time series regression models: Estimation and prediction	4
Lec 6	Time series regression models: Diagnostics	2
Lec 7-8	Evaluating forecast accuracy	4
Lec 9-10	Artificial neural networks	4
Lec 11	Combining forecasts	2
Lec 12	Hierarchical forecasting	2
Lec 13	Quantile regression	2
Lec 14-15	Overview of contemporary forecasting literature	4
	Total hours	**30**

Laboratory		**Number of hours**
Lab 1	Back to school: Naïve predictions	2
Lab 2-3	Exponential smoothing	4
Lab 4-5	Time series regression models: Estimation and prediction	4
Lab 6	Time series regression models: Diagnostics	2
Lab 7-8	Evaluating forecast accuracy	4
Lab 9-10	Artificial neural networks	4
Lab 11-12	Combining forecasts	4
Lab 13	Hierarchical forecasting	2
Lab 14-15	Quantile regression	4
	Total hours	**30**

TEACHING TOOLS USED
N1. Multimedia presentations. N2. Computational tasks in Julia, MATLAB/Octave, Python or R.

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes	Way of evaluating learning outcomes achievement
F1	PEU_W01, PEU_U01, PEU_K01	Assignments (in-class, reports)
F2	PEU_W01, PEU_U01	Exam
P = 0,5*F1 + 0,5*F2; computed in percentage points (%), transformed into the scale 2-5.5		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] R. Hyndman, G. Athanasopoulos (2021) *Forecasting: Principles and Practice*, 3rd ed., OTexts (https://otexts.com/fpp3)

SECONDARY LITERATURE:

[1] F. Diebold (2015) *Comparing predictive accuracy, twenty years later: A personal perspective on the use and abuse of Diebold-Mariano tests*, Journal of Business & Economic Statistics 33:1, 1-9

[2] M. Hagan, H. Demuth, M. Beale, O. De Jesus (2014) *Neural Network Design*, Martin Hagan

[3] R. Hyndman, A. Koehler (2006) *Another look at measures of forecast accuracy*, International Journal of Forecasting 22(4), 679-688

[4] A. Jędrzejewski, J. Lago, G. Marcjasz, R. Weron (2022) *Electricity price forecasting: The dawn of machine learning*, IEEE Power & Energy Magazine 20(3), 24-31

[5] J. Nowotarski, R. Weron (2018) *Recent advances in electricity price forecasting: A review of probabilistic forecasting*, Renewable and Sustainable Energy Reviews 81(1), 1548-1568

[6] X. Wang, R. Hyndman, F. Li, Y. Kang (2023) *Forecast combinations: An over 50-year review*, International Journal of Forecasting 39(4), 1518-1547

[7] C. Weiss, E. Raviv, G. Roetzer (2018) *Forecast combinations in R using the ForecastComb package*, The R Journal 10(2), 262-281

[8] R. Weron (2014) *Electricity price forecasting: A review of the state-of-the-art with a look into the future*, International Journal of Forecasting 30(4), 1030-1081

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

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Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish: Zarządzanie projektami
Name of subject in English: Project management
Main field of study (if applicable): Business Engineering
Specialization (if applicable): Business Intelligence
Profile: academic
Level and form of studies: 2nd level, full-time
Kind of subject: obligatory
Subject code W08IZZ-SM8014
Group of courses NO

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	**15**		**30**	**15**	
Number of hours of total student workload (CNPS)	**50**		**50**	**50**	
Form of crediting	**Examination**		**crediting with grade**	**crediting with grade**	
For group of courses mark (X) final course					
Number of ECTS points	**2**		**2**	**2**	
including number of ECTS points for practical classes (P)			**2**	**2**	
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)	**0,76**		**1,28**	**0,68**	

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

Knowledge of basic waterfall project management processes, knowledge of agile project management, skills of defining, planning and controlling a simple project

SUBJECT OBJECTIVES

C1 Provide students with knowledge on methods and approaches of advanced project management
C2 Develop a critical and creative approach to project management, the ability to create tailor-made solutions for project management

SUBJECT EDUCATIONAL EFFECTS

Relating to knowledge:
PEU_W01: The student understands and has knowledge of: advanced methods in project defining, planning, controlling and closing processes
PEU_W02: the student knows portfolio and program management

Relating to skills:
PEU_U01: The student is able to select and use appropriate methods for project, portfolio and program management and to modify them to the current needs

PEU_U02: The student is able to efficiently present project proposals in calls for projects

Relating to social competences:
PEU_K01: the students is able to discuss project management problems and to elaborate a compromise solution in a small group small.
PEU_K02: the students is able to present orally a project proposal in a very short time duration.

PROGRAMME CONTENT		
Lecture		**Number of hours**
Lec 1	Contemporary needs in project management	1
Lec 2	Project success definition, criteria and factors	2
Lec 3	Advanced project stakeholders management	2
Lec 4	Advanced project risk management	2
Lec 5	Advanced project cost estimation and control methods	2
Lec 6	Advanced project scheduling and time control methods	2
Lec 7	Project value definition	2
Lec 8	Project metrics	2
	Total hours	**15**

Laboratory		**Number of hours**
Lab 1	Repetition of project planning in MS Project based on small case studies	4
Lab 2	Repetition of measuring and evaluating project progress in MS project, based on small case studies	4
Lab 3	Project programme management in MS Project (master and subprojects)	2
Lab 4	Project programme management in MS Project (resource pools)	2
Lab 5	Custom fields and graphical indicators in MS Project	2
Lab 6	Designing reports in MS Project	2
Lab 7	Formatting in MS Project	2
Lab 8	Simulation of a project case study using MS Project – planning	4
Lab 9	Simulation of a project case study using MS Project – control and closing	4
Lab 10	Application of RISKamp to project risk management	4
Lab 11	Application of system dynamics to project management	4
Lab 12	Final exam	2
	Total hours	**30**

Project		**Number of hours**
Proj 1	Presentation of various calls for projects, formation of groups	1
Proj 2	Presentation of principles of writing project proposals	2

Proj 3	Selection of calls and themes by the groups	2
Proj 4	Presentation of project ideas – project 1	2
Proj 5	Presentations of project proposals – project 1	2
Proj 6	Expert evaluation results of project proposals – project 1	2
Proj 7	Lessons learnt – project 1	2
Proj 8	Oral short presentations of project 1	2
	Total hours	**15**

TEACHING TOOLS USED
TEACHING METHODS 1. theoretical lecture combined with discussion 2. Solving problems and small case studies in groups using Microsoft Project, Excel with RISKamp and Vesima software 3. Presenting project proposals in an oral and written form

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
F1	PEU_W01, PEU_U01	project planning - evaluation of laboratory work
F2	PEU_W01, PEU_U01	project implementation control - evaluation of laboratory work
F3	PEU_W01, PEU_U01	programme management - evaluation of laboratory work
F4	PEU_W01,PEU_U01	reporting - evaluation of laboratory work
F5	PEU_W01, PEU_U01	risk management - assessment of laboratory work
F6	PEU_U02,PEU_K01, PEU_K02	evaluation of the project proposal - evaluation of the project work
F7	PEU_W01,PEU_W02, PEU_W03,PEU_W04	Lecture test
P(Lecture)=F7 P(Laboratory)=$\frac{\sum_{i=1}^{5} F_i}{5}$ P(Project)=0,5F5+0,5F6		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

1. Gray C.F., Larson E.W., Desai G.V. (2013), Project Management, MCGraw Hill
2. Kerzner H. (2005), Advanced Project Management, Helion
3. Kerzner H. (2017), Project Management Metrics, KPIs, and Dashboards: A Guide to Measuring and Monitoring Project Performance, Wiley

SECONDARY LITERATURE:

1. Brzozowska A. (2021), A functional approach to sustainable project management, Taylor and Francis
2. Grucza B. (2019), Zarządzanie interesariuszami projektu, PWE
3. Hoffmann M.R. (2015), How to write effective EU proposals, EU
4. Moustafaev J. (2015), Project scope management, CRC Press
5. Venkataraman R.R., Pinto K.P. (2008), Cost and Value Management in Projects, John Wiley & Sons
6. Wysocki R.K. (2014), Effective Project Management, John Wiley & Sons

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

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Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish Usługi chmurowe
Name of subject in English Cloud computing services
Main field of study (if applicable): Business Engineering
Specialization (if applicable): Business Intelligence
Profile: academic
Level and form of studies: 2nd level, full-time
Kind of subject: obligatory
Subject code W08IZZ-SM8017
Group of courses YES

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)			**15**		**15**
Number of hours of total student workload (CNPS)			**25**		**25**
Form of crediting			**crediting with grade**		**crediting with grade**
For group of courses mark (X) final course			**X**		
Number of ECTS points			**2**		
including number of ECTS points for practical classes (P)					
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)			**1,36**		

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Basic understanding of multi-tier architecture and Internet applications.

SUBJECT OBJECTIVES

C1 Acquire knowledge of the capabilities and applications of modern cloud technologies in management, supporting the functioning of organizations and in the work of the engineer-manager.
C2 Acquire skills in selecting and configuring cloud services, and deploying selected applications.

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:
PEU_W01 Has knowledge of the operation and functionality of cloud technologies and services.
PEU_W02 Has knowledge of the applications of cloud services in management, supporting the operations of organizations and in the work of engineers/managers.
relating to skills:
PEU_U01 Can acquire the information necessary to identify modern cloud technologies and services, can compare offerings in the vendor market and match them to the organization's needs.
PEU_U02 Can identify features, advantages, disadvantages and applications of existing cloud

technologies and can critically evaluate them.
PEU_U03 Can implement selected solutions to support the operations of organizations and the work of engineers/managers.

PROGRAMME CONTENT

Laboratory		Number of hours
Lab 1	Discussing the safety and class regulations as well as the scoring/grading policy.	1
Lab 2	1A. Hosting services: creating an account, overview of applications in the app installer, installing and testing a Content Management System.	2
Lab 3	1B. Overview of the features of a hosting server. File management. Discussing results and crediting tasks 1A and 1B.	2
Lab 4	2A. Hosting services: installing and implementing a selected Internet application.	2
Lab 5	2B: Overview and deployment of selected applications/plugins. Discussing results and crediting tasks 2A and 2B.	
Lab 6	3A. Cloud services of a leading global provider, such as Microsoft Azure. Deploying selected applications.	2
Lab 7	3B.Deploying virtual machines and working with a remote desktop of a cloud workstation. Discussing results and crediting tasks 3A and 3B.	2
Lab 8	Retake class and extra tasks. Grading.	2
	Total hours	15

Seminar		Number of hours
Semin 1	Introduction to the seminar. Discussing the class rules and the scoring/grading policy. Allocation of topics to be presented.	1
Semin 2	Types of clouds and models of cloud services. The benefits of cloud computing.	2
Semin 3	Basic file storage and synchronization services.	2
Semin 4	Cloud solutions offered by leading global providers such as Microsoft, Amazon, Google, IBM, Oracle.	2
Semin 5	Cloud solutions offered by Polish and EU companies, such as Octawave, Beyond.	2
Semin 6	Applications of the cloud in various areas of business activity.	2
Semin 7	Component selection and migration to the cloud. Reliability, security and legal aspects.	2
Semin 8	Challenges of the future and directions of cloud services development. Summary of the topics discussed throughout the semester.	2
	Total hours	15

TEACHING TOOLS USED

N1. Resources published in the university ePortal course website.
N2. Lab assignment lists and seminar topics.
N3. Google, Microsoft, Amazon and Oracle cloud web services.
N4. Scientific elaboration of topics based on literature analysis.
N5. Presentation of issues at the seminar - slideshow or software, and discussion.

N6. Group discussion.

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
F1	PEU_W01, PEU_W02	Evaluation of the content and presentation of the seminar essay and participation in the discussion.
F2	PEU_U01, PEU_U02, PEU_U03	Evaluation of the lab assignments and reports.
P = 0,5*F1 + 0,5*F2. Passing scores of both F1 and F2 required.		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Papers, links and instructions published in the university ePortal course website.
[2] Haque E., The Ultimate Modern Guide to Cloud Computing: Everything from Cloud Adoption to Business Value Creation. IP 2020.
[3] Ainsley A., Google Cloud Platform: Learn Google Cloud Platform from the Scratch: The Ultimate Guide for Beginners, IP 2020.
[4] Gouic B., Microsoft Azure Tutorial: Public Cloud Computing platform. GB 2020.

SECONDARY LITERATURE:

[1] Hunter T., Building Google Cloud Platform Solutions: Develop scalable applications from scratch and make them globally available in almost any language, Packt Publishing, 2019.
[2] Toroman M., Azure Networking Cookbook: Practical recipes for secure network infrastructure, global application delivery, and accessible connectivity in Azure, Packt Publishing, 2021.

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

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Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish: Analiza Normatywna
Name of subject in English: Prescriptive Analytics
Main field of study (if applicable): Business Engineering
Specialization (if applicable): Business Intelligence
Profile: academic
Level and form of studies: 2nd level studies, full-time
Kind of subject: obligatory
Subject code W08IZZ-SM8019
Group of courses: NO

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	**30**		**30**		
Number of hours of total student workload (CNPS)	**50**		**75**		
Form of crediting	**Examination**		**Crediting with grade**		
For group of courses mark (X) final course					
Number of ECTS points	**2**		**3**		
including number of ECTS points for practical classes (P)			**3**		
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)	**1,28**		**1,28**		

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Knowledge of matrix algebra
2. Ability to use computational software (MATLAB, R)

SUBJECT OBJECTIVES

C1 To gain knowledge on formulating decision models
C2 To learn how to evaluate alternatives
C3 To be able to build composite indicators

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:
PEU_W01 Student has in-depth knowledge of mathematical models to support decision making in management.
PEU_W02 Student has knowledge of building composite indicators under different preference structures.
relating to skills:
PEU_U01 Student can formulate decision models.
PEU_U02 Student can evaluate alternatives and support decision making.
relating to social competences:

PEU_K01 Student can enlarge His/Her knowledge and abilities, as well as to work in groups to formulate and to appraise decision models.

PROGRAMME CONTENT		
Lecture		**Number of hours**
Lec 1	Decision Analysis, Decision Support Systems and Business Intelligence	2
Lec 2	Decision Tree Analysis to Evaluate Alternatives	2
Lec 3	Fundamentals of Linear Programming	2
Lec 4	Duality and Sensitivity Analysis	2
Lec 5	Transportation and Assignment Problems	2
Lec 6	Graph Theory and Optimization	2
Lec 7	Multi-objective Mathematical Programming	2
Lec 8	Multi-Criteria Analysis	2
Lec 9	UTA Method and its Variants	2
Lec 10	Analytic Hierarchy Process	2
Lec 11	Efficiency Measurement	2
Lec 12	Incorporating Value Judgments in Efficiency Measurement	2
Lec 13	Efficiency Measurement in Processes with Network Structures	2
Lec 14	Building Indices with Hierarchical Structure	2
Lec 15	Course Assessment	2
	Total hours	30

Laboratory		**Number of hours**
Lab 1	Introduction to Matlab, R – lpsolve and Gurrobi Optimizer	2
Lab 2	Decision Tree Analysis	2
Lab 3	LP formulation in Matlab, R	2
Lab 4	Sensitivity Analysis and Visualization	2
Lab 5	Specific Cases in Linear Programming	2
Lab 6	Specific Cases in Linear Programming	2
Lab 7	Solution Methods in Multi-objective Mathematical Programming	2
Lab 8	Presentation of Group Assignments	2
Lab 9	UTASTAR and UTADIS - Applications	2
Lab 10	Group Decision Making with Analytic Hierarchy Process	2
Lab 11	Performance Measurement	2

Lab 12	Hybrid Approaches in Performance Measurement	2
Lab 13	Performance of Supply Chains	2
Lab 14	Deriving Composite Indicators	2
Lab 15	Presentation of Group Assignments	2
	Total hours	30

TEACHING TOOLS USED
N1. Slide Presentations N2. Step-by-step solutions of examples N3. Set of case studies and software illustration (Matlab, R)

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes	Way of evaluating learning outcomes achievement
F1	PEU_U01, PEU_U02, PEU_K01	Report of team work results
F2	PEU_U01, PEU_U02, PEU_K01	Report of team work results
F3	PEU_W01, PEU_W02, PEU_U01, PEU_U02	Test
P (W) = 0.5 F3 + 0.5 Participation P (L) = 0.4 F1 + 0.4 F2 + 0.2 Participation		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Greco, S., Figueira, J., & Ehrgott, M. (2016). Multiple criteria decision analysis. New York: Springer.
[2] Cooper, W. W., Seiford, L. M., & Tone, K. (2006). Introduction to data envelopment analysis and its uses: with DEA-solver software and references. Springer Science & Business Media.
[3] Miettinen, K. (2012). Nonlinear multiobjective optimization. Springer Science & Business Media.

SECONDARY LITERATURE:

[1] Dantzig, G. B., & Thapa, M. N. (2006). Linear programming 2: theory and extensions. Springer Science & Business Media.

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

Dimitrios Sotiros (dimitrios.sotiros@pwr.edu.pl)

Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish: Modele biznesowe w rozwijającym się otoczeniu
Name of subject in English: Business models in a developing environment
Main field of study (if applicable): Business Engineering
Specialization (if applicable): Business Intelligence
Profile: academic
Level and form of studies: 2nd level, full-time
Kind of subject: optional
Subject code W08IZZ-SM8020
Group of courses YES

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	**15**			**15**	
Number of hours of total student workload (CNPS)				**50**	
Form of crediting				**crediting with grade**	
For group of courses mark (X) final course				**X**	
Number of ECTS points				**2**	
including number of ECTS points for practical classes (P)				**1**	
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)				**1,36**	

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Knowledge of the basics of entrepreneurship.
2. Knowledge of the basics of management.

SUBJECT OBJECTIVES

O1 Knowledge of basic business models.
O2 Knowledge of the organizational environment analysis process
O3 The ability to identify changes taking place in the environment and to select an appropriate business model

SUBJECT EDUCATIONAL EFFECTS

In the field of knowledge:
PEU_W01 Identifies inter-organizational relations and interactions of an organization with the environment in the context of national, international and intercultural conditions. Explains and illustrates the impact of the environment on the activities of the organization.
PEU_W02 Has extended and deepened substantive knowledge on the organization and functioning of the company in the field of strategic management, logistics, marketing, finance, business architecture.

PEU_W03 Knows and understands the norms and standards (economic, legal, organizational and ethical) that determine the context of the functioning of the economy and organization.

In the field of skills:

PEU_U01 Is able to analyze and evaluate the objectives, features, elements, processes, functional areas in the enterprise as well as internal and inter-organizational relations, using concepts and theoretical approaches in the field of social sciences, in particular the discipline of management and quality science.

PEU_U02 Is able to formulate innovative alternative solutions to management and substantive problems in the enterprise. He can justify, make a choice and verify them in accordance with the established priorities. Can plan actions to solve them.

Relating to social competences:

PEU_K01

Is aware of the need for an independent, critical assessment of the scope and level of their knowledge of establishing and running a business Is prepared to independently search for areas of knowledge to supplement and skills to improve.

PROGRAMME CONTENT		
Lecture		**Number of hours**
Lec 1	Introduction, discussion of learning outcomes and conditions for passing the course. Definition and concept of the business model.	1
Lec 2	Analysis of the organization's environment and its impact on the choice of the business model. Methods of analysis of the external environment of business activities.	2
Lec 3	Business models - review of literature proposals. Evolution of business models and examples of their classification. Common business models, analysis and known examples of their application.	3
Lec 4	A business model as a tool for implementing a business plan. Lean canvas as a tool for building an innovative business model. Business model for start-up.	2
Lec 5	The business model and the company's strategy. Determinants of choosing a business model. Circular business model.	2
Lec 6	Basic principles of designing and introducing changes in the business model - characteristics of the elements of business models by industry.	2
Lec 7	Implementing sustainable development using business models Sustainable business models.	2
Lec 8	Test	1
	Total hours	15

Project		**Number of hours**
Proj 1	Introduction.	1
Proj 2	Identifying business models - case study.	2
Proj 3	Modernization of the functioning business model - case study.	2

Proj 4	Selection of the project entity, diagnosis of the organization.	1
Proj 5	Analysis of the environment of the studied organization - presentation.	2
Proj 6	Proposed variants of a new business model, impact forecast - presentation, discussion.	3
Proj 7-8	Final presentations.	4
	Total hours	15

TEACHING TOOLS USED
N1. multimedia presentation N2. presentation of sub-tasks N3. project presentation

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
F1	PEU_W01 PEU_W02 PEU_W03	Written test
F2	PEU_U01 PEU_U02	Assessment of the presentation of sub-tasks
F3	PEU_K01	Project defense
P = F1*0,5+ (0,4*F2+0,6*F3)*0,5		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Osterwalder A., Pigneur Y. (2010), Business Model Generation, John Wiley & Sons

[2] Muehlhausen J. (2018) Business Models For Dummies, John Wiley & Sons

[3] Allen M. (2001) Analysing the Organisational Environment, Select Knowledge

SECONDARY LITERATURE:

[1] Johnson, M.W., Christensen, C. (2008). Reinventing your business model. Harvard Business Review, 86(12), 51–59

[2] Linder, J., Cantrell, S. (2000). Changing business models: Surveying the landscape. Institute for Strategic Change working paper, Accenture

[3] Rappa, M. Business models on the Web. http://digitalenterprise.org/models/ models.html

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

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Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish: Planowanie biznesu
Name of subject in English: Business planning
Main field of study (if applicable): Business Engineering
Specialization (if applicable): Business Intelligence
Profile: academic
Level and form of studies: 2nd level, full-time
Kind of subject: optional
Subject code W08IZZ-SM8021
Group of courses YES

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	**15**			**15**	
Number of hours of total student workload (CNPS)	**50**				
Form of crediting	**crediting with grade**				
For group of courses mark (X) final course	**X**				
Number of ECTS points	**2**				
including number of ECTS points for practical classes (P)	**1**				
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)	**1,36**				

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Basic knowledge of management.

SUBJECT OBJECTIVES

C1 An acquaintance with principles of a business plan's preparation and presentation.
C2 Consolidation and practical application of knowledge about law and administrative business regulations.
C3 Training in a specific application of knowledge about strategic analysis, marketing planning and financial planning.

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:
PEU_W01 Identifies inter-organizational relations and interactions of the organization with the environment. Explains and illustrates the impact of the environment on the activities of the organization when developing a business plan.
PEU_W02 Has extended and in-depth substantive knowledge of the organization and operation of an enterprise necessary for running a business.
PEU_W03 Knows and understands the norms and standards (economic, legal, organizational and ethical) for establishing and running a business.
PEU_W04 Knows and understands the concepts, theories, methods and instruments in the field of economic and legal policy used to start and run a business.
relating to skills:

PEU_U01 Is able to use the acquired knowledge in the selection of sources and information necessary to create a business plan.
PEU_U02 Has the ability to analyze the causes and dynamics of phenomena in the organization's environment in the conditions of the market economy and the applicable economic and legal regulations in order to create a business plan and implement it.
PEU_U03 Is able to analyze and evaluate the goals, features, elements, processes, functional areas in the enterprise as well as internal and inter-organizational relations in creating a business plan.
PEU_U04 Is able to use the acquired knowledge to analyze economic phenomena and solve economic problems as well as adapt, justify and apply appropriate norms and standards (economic, legal, social) in the preparation and implementation of a business plan.
relating to social competences:
PEU_K01
Is aware of the need for an independent, critical assessment of the scope and level of their knowledge of establishing and running a business Is prepared to independently search for areas of knowledge to supplement and skills to improve.

PROGRAMME CONTENT		
Lecture		**Number of hours**
Lec 1	Entrepreneurship, sources of business ideas, business plan (structure and content).	2
Lec 2	Economic activity - legal framework. Procedure for starting a business.	2
Lec 3	Methods for analyzing the macro-environment.	2
Lec 4	Methods for analyzing the micro-environment and the company's potential. Business environment institutions.	2
Lec 5	Financial statements and indicators.	2
Lec 6	Sources of financing economic ventures.	2
Lec 7	Business plan implementation.	2
Lec 8	Written test.	1
	Total hours	15

Project		**Number of hours**
Proj 1	Introduction	1
Proj 2	The choice of the business enterprise’s scope and form – presentations and discussion.	2
Proj 3	Micro-environment of the companies analysis – presentations and discussion.	2
Proj 4	Macro-environment of the companies analysis – presentations and discussion.	2
Proj 5	The plan of marketing activities – presentations and discussion.	2
Proj 6	Financial needs’ forecast – presentations and discussion.	2
Proj 7-8	Projects’ acceptance and presentations.	4
	Total hours	15

TEACHING TOOLS USED
N1. multimedia presentation N2. presentation of sub-tasks N3. discussion N4. project presentation

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
F1	PEU_W01-W04	Written test
F2	PEU_U01-U03	Assessment of the presentation of sub-tasks
F3	PEU_U04	Assessment of preparation for discussion
F4	PEU_K01 PEU_U04	Project defense
P = F1+ F4 + F3 + F2 F1 up to 40 points, F4 up to 40 points, F3 up to 10 points, F2 up to 10 points 91-100 points = 5.0 81-90 points = 4.5 71-80 points = 4.0 61-70 points = 3.5 51-60 points = 3.0 0-50 points = 2.0		

PRIMARY AND SECONDARY LITERATURE
PRIMARY LITERATURE:
[1] Berry, T. (2006). Hurdle: the book on business planning: How to develop and implement a successful business plan. Palo Alto Software, Inc. [2] David, F., & David, F. R. (2020). Strategic management: A competitive advantage approach, concepts and cases. [3] Schwetje, G., & Vaseghi, S. (2007). The business plan: how to win your investors' confidence. Springer Science & Business Media.
SECONDARY LITERATURE:
[1] Schramm, C. J. (2018). Burn the Business Plan: What Great Entrepreneurs Really Do. Simon and Schuster. [2] Fiore, F. (2005). Write a business plan in no time. Que publishing.
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Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish: Społeczna odpowiedzialność biznesu
Name of subject in English: Corporate Social Responsibility
Main field of study (if applicable): Business Engineering
Specialization (if applicable): Business Intelligence
Profile: academic
Level and form of studies: 2nd level, full-time
Kind of subject: optional
Subject code W08IZZ-SM8022
Group of courses YES

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	**15**				**15**
Number of hours of total student workload (CNPS)	**50**				**50**
Form of crediting	**crediting with grade**				
For group of courses mark (X) final course	**X**				
Number of ECTS points	**2**				
including number of ECTS points for practical classes (P)	**1**				
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)	**1,36**				

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

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SUBJECT OBJECTIVES

C1. To deliver the basic conceptual foundations of corporate social responsibility
C2. To explore main issues and challenges typically encountered by the company in managing social responsibilities in relations with different stakeholders.
C3. To encourage making thoughtful judgments when faced with social responsibilities in business practice.

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:
PEU_W01 - has a basic knowledge about corporate social responsibility agenda and perspectives
PEU_W02 - has a basic knowledge about managing corporate social responsibility
PEU_W03 – understands main issues and challenges typically encountered by the company in managing social responsibilities in relations with different stakeholder groups
relating to skills:

PEU_U01 – identifies, analyzes and evaluates application of CSR in relations with different stakeholder groups
PEU_U02 – identifies and analyzes main issues and challenges typically encountered by the company in CSR management
relating to social competences:
PEU_K01 – is prepared to behave in a professional and ethical manner, to recognize and formulate the ethical dilemmas associated with his/her own and others' work; to seek appropriate solutions and opportunities to correct deficiencies in their attitudes and behaviors in the workplace

PROGRAMME CONTENT		
Lecture		**Number of hours**
Lec 1	Corporate Social Responsibility agenda	2
Lec 2	Perspectives on CSR. The business case for CSR	2
Lec 3	Actors and drivers of CSR	2
Lec 4	Managing CSR: Corporate Governance and CSR	2
Lec 5	Managing CSR: Developing CSR strategy	2
Lec 6	Managing CSR: CSR reporting and auditing CSR	2
Lec 7	Managing CSR: Responsibility in supply chain. Partnerships and self-Regulation	2
Lec 8	Final assessment	1
	Total hours	15

Seminar		**Number of hours**
Semin 1	Organizational meeting	1
Semin 2	Applying CSR in the marketplace	2
Semin 3	Applying CSR in the workplace	2
Semin 4	Applying CSR in the community	2
Semin 5	Applying CSR and the ecological environment	2
Semin 6	Developing CSR strategy – case study	2
Semin 7	CSR reporting and auditing CSR – case study	2
Semin 8	Partnerships and self-Regulation – case study	2
	Total hours	15

TEACHING TOOLS USED

N1. Multimedia presentations
N2. Case studies
N3. Students’ presentations

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
F1	PEU_W01-W03	written assessment
F2	PEU_U01-U02, PEU_K01	students' presentation
F3	PEU_U01-U02, PEU_K01	students' involvement during case study solving
P= 0,5*F1+0,4*F2+0,1*F3		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Crane, A., McWilliams, A., Matten, D., Moon, J., & Siegel, D. S. (Eds.), The Oxford handbook of corporate social responsibility, Oxford Handbooks, 2008.
[2] Blowfield M., Murray A., Corporate social responsibility, OXFORD University Press, 2019.

SECONDARY LITERATURE:

[1] Crane, A., Matten, D., & Spence, L. (Eds.), Corporate social responsibility: Readings and cases in a global context, Routledge, 2019.
[2] Chrysides G.D., Kaler J.H.: Essentials of business ethics, McGrawhill, 1996.
[3] Crane A., Matten D., Glozer, S., & Spence, Business Ethics: Managing Corporate Citizenship and Sustainability in the Age of Globalization, Oxford University Press, 2019.
[4] Ferrell O. C., Business ethics: ethical decision making and cases, Houghton Mifflin Co., New York 2005.
[5] Gini A. [ed.], Case studies in business ethics, Pearson Pretice Hall, Upper Saddle River 2005.
[6] Giacalone R.A., Jurkiewicz C.L., Dunn C. [ed.], Positive psychology in business ethics and corporate responsibility, Information Age Pub., Greenwich 2005.
[7] Murphy P.E., Laczniak G.R., Marketing ethics: cases and readings, Pearson Prentice Hall, Upper Saddle River 2006.
[8] Sternberg E.: Just Business, Oxford University Press, New York 2002.
[9] Journals like "Journal of Business Ethics".

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Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish: Psychologia Biznesu
Name of subject in English: Business Psychology
Main field of study (if applicable): Business Engineering
Specialization (if applicable): Business Intelligence
Profile: academic
Level and form of studies: 2nd level, full-time
Kind of subject: optional
Subject code W08IZZ-SM8023
Group of courses NO

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)					**30**
Number of hours of total student workload (CNPS)					**30**
Form of crediting					**crediting with grade**
For group of courses mark (X) final course					
Number of ECTS points					**2**
including number of ECTS points for practical classes (P)					**2**
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)					**1,28**

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Basic knowledge of general psychology, i.e. mechanisms that guide thinking, decision-making and motivated human behavior
2. Ability to speak and write concisely.
3. Knowledge of presentation techniques.
4. Ability to work in groups.

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SUBJECT OBJECTIVES

C1 Acquainting students with the psychology of individual and group behavior and their interaction
C2 Developing awareness of the importance of psychological aspects of matching an individual to specific career patterns
C3 Acquainting students with the importance of leadership in an organization and psychological processes in terms of predictors and leadership consequences for organizations and employees
C4. Developing skills associated with researching theoretical and practical data, understanding results of scientific research, communicating effectively outcomes of scientific research

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:
PEU_W01 Understands the role of the interaction of individuals and groups in a specific organizational context.
relating to skills:
PEU_U01 Identifies psychological factors contributing to employees work motivation, satisfaction and engagement.

PEU_U02 Identifies psychological factors contributing to effective managing people in project tasks and successful organizational leadership.
relating to social competences:
PEU_K01 Communicates effectively and empathetically with others, while respecting different perspectives and worldviews
PEU_K02 Can convey his own views and stand up for them. Is prepared to persuade and negotiate for the sake of achieving common goals.

PROGRAMME CONTENT

Seminar		Number of hours
Se 1	Analysis of the organization as an interactive system of mutual interactions between employees and the organization - a psychological perspective	2
Se 2	Individual differences of employees and their fit to the profession	2
Se 3	Individual differences between employees in terms of resources and ability to meet job demands: cognitive demands, emotional demands, quantitative demands, and work pace	2
Se 4	Perception of meaning of work and the sense of influence at work	2
Se 5	Attitudes, values and job satisfaction as determinants of commitment to work	2
Se 6	Employee - co-workers - managers interactions: social climate at work, sense of justice, and relations with management	2
Se 7	Motivation at work: internal employee motivation: determinants and consequences	2
Se 8	Motivation at work: external motivators and their importance	2
Se 9	Building teams and effective functioning of teams	2
Se 10	Individual behavior in project teams; innovative teams of the world	2
Se 11	Psychology decision-making and moral judgment: cases of bankruptcy of "big business"	2
Se 12	The emergence of leadership: psychological and organizational determinants of differences between leaders and managers. A biographical study of great world leaders.	2
Se 13	Employee well-being: health, stress, and stress coping	2
Se 14	Mobbing at work	2
Se 15	Psychological differences between employees of business organizations and non-governmental organizations	2
	Total hours	**30**

TEACHING TOOLS USED

N1. Analyzing scientific publications
N2. Case studies
N3. In-class video material/discussion
N4. Multimedia presentation

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
F1	PEU_U01, PEU_U02, PEU_W01	Assessment of the formal value and practical significance of the tasks performed. Two assignements/tasks
F2	PEU_K01, PEU_K02	Appraisal of in-class activity and group work
P (seminar) = 2*0,4*F1 + 0,2*F2		

PRIMARY AND SECONDARY LITERATURE
PRIMARY LITERATURE: [1] McKenna, E. (2020; 6th ed.). *Business psychology and organizational behaviour.* Routledge: ISBN-13: 978-1138182646 [2] Johnson, R.D., ed. (2021). *Handbook of research on multidisciplinary perspectives on managerial and leadership psychology (Advances in logistics, operations, and management science).* Business Science Reference: ISBN-13: 978-1799838111 [**3**] Sawhney, G., Michel, J.S. (2021). Challenge and Hindrance Stressors and Work Outcomes: the moderating Role of Day-Level Affect. *Journal of Business and Psychology*, 36,4. **SECONDARY LITERATURE:** [2] Kahneman, D. (2013). *Thinking, Fast and Slow*. Farrar, Straus and Giroux: ISBN 13: 978-0374533557
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Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish: Kierowanie zespołami i grupami roboczymi
Name of subject in English: Leading teams and work groups
Main field of study (if applicable): Business Engineering
Specialization (if applicable): Business Intelligence
Profile: academic
Level and form of studies: 2nd level, full-time
Kind of subject: optional
Subject code W08IZZ-SM8024
Group of courses NO

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)					**30**
Number of hours of total student workload (CNPS)					**50**
Form of crediting					**crediting with grade**
For group of courses mark (X) final course					
Number of ECTS points					**2**
including number of ECTS points for practical classes (P)					**2**
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)					**1,28**

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Ability to speak and write concisely.
2. Knowledge of presentation techniques.
3. Ability to work in groups.

SUBJECT OBJECTIVES

C1 Acquainting students with leading effective teams and work groups
C2 Acquainting students with the psychological processes of emergence of team leadership and the consequences of dysfunctional leadership
C3 Developing the ability to build effective teams and work groups
C3 Developing skills related to analyzing theoretical data and conducting empirical research, understanding research results, effectively communicating research results in the field of team and working group leadership

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:
PEU_W01 Has knowledge of how to effectively build and manage teams and workgroups
relating to skills:
PEU_U01 Has the ability to take the role of a team leader, encourage continuous learning, deal with conflicts, time pressure and other responsibility systems
PEU_U01 Skillfully uses tools to measure team effectiveness, predict effectiveness and identify adequate consequences
relating to social competences:

PEU_K01 Communicates effectively and empathetically with others while respecting different perspectives
PEU_K02 Is prepared to persuade and negotiate for the sake of achieving common goals

PROGRAMME CONTENT

Seminar		Number of hours
Se 1	Types of teams; differences between teams and workgroups	2
Se 2	Leading teams and work groups: individual differences between members and the cohesion of teams and groups	2
Se 3	Developing trust between team members and workgroups	2
Se 4	Communication in teams and workgroups	2
Se 5	Supporting community in terms of attitudes, values and commitment to the work of the team or working groups	2
Se 6	Managing the decision-making process in teams and working groups	2
Se 7	Developing social capital through networking and information exchange	2
Se 8	Motivation: internal motivation of team members and groups - determinants and consequences; external motivators and their meaning	2
Se 9	Building and developing effective teams and work groups	2
Se 10	Measurement of the effectiveness of teams and working groups	2
Se 11	Managing conflicts in teams and working groups	2
Se 12	Psychological determinants of dysfunctional teams and groups	2
Se 13	Supporting creativity and innovation among team members and working groups (the most innovative teams in the world)	2
Se 14	Rewarding teams and workgroups	2
Se 15	Leading virtual teams and workgroups	2
	Total hours	**30**

TEACHING TOOLS USED

N1. Analyzing scientific publications
N2. Case studies
N3. In-class video material/discussion
N4. Multimedia presentation

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
F1	PEU_W01, PEU_U01, PEU_U02	Assessment of the formal value and practical significance of the tasks performed.
F2	PEU_W01, PEU_U01, PEU_U02	Assessment of the formal value and practical significance of the tasks performed
F3	PEU_K01, PEU_K02	Appraisal of in-class activity and group work
P (seminar) = 0,4*F1+ 0,4*F2+ 0,2*F3		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Thompson, L. (2017). *Making the team. A guide for managers* (6th edition). Pearson ISBN-10: 0134484207

ISBN-13: 978-0134484204

[2] Govindarajan, V. & Trimble, C. 2010. Assemble the Dedicated Team: Seven Common Traps to Avoid When Building an Innovation Team; Harvard Business School; 7055BC-PDFENG; 30p [3] Sethi, R., Smith, D. C., Park, W. C. 2002. How to kill a team's creativity. Harvard Business Review, Volume: 80, Issue: 8, pp: 16-17

SECONDARY LITERATURE:

[1] "Teams": Group Dynamics For Teams, by Daniel Levi, 4th Edition (2014), Sage Publications; ISBN 978-1-4129-9953-3

[2]"Conversations": Difficult Conversations: How To Discuss What Matters Most, by Douglas Stone, Bruce Patton, and Sheila Heen; Penguin Books (2010); ISBN 978-0-14-311844-2

[3] Assigned TED conferences and podcasts; examples:

Rheingold: The new power of collaboration

Fried: Why work doesn't happen at work

Shiv: Sometimes it's good to give up the driver's seat

Riccardi: Cross cultural communication

Johnson: Where good ideas come from

Grady: How to save the world (or at least yourself) from bad meetings

SUBJECT SUPERVISOR

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Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish: Warsztat kreatywnego myślenia
Name of subject in English: Creative and design thinking workshop
Main field of study (if applicable): Business Engineering
Specialization (if applicable): Business Intelligence
Profile: academic
Level and form of studies: 2nd levels studies, full-time
Kind of subject: obligatory
Subject code: W08IZZ-SM8025G
Group of courses: YES

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)				**15**	**30**
Number of hours of total student workload (CNPS)				**25**	**50**
Form of crediting					**crediting with grade**
For group of courses mark (X) final course					**X**
Number of ECTS points					**3**
including number of ECTS points for practical classes (P)					**2**
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)					**1,96**

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

There are no mandatory pre-requisites to attend this course

SUBJECT OBJECTIVES

C1 To expose students to the design process as a tool for innovation.
C2 To make students understand design thinking and its five steps.
C3 To acquire knowledge about the various tools, techniques and templates used in design thinking.
C4 To apply the tools taught onto real life environment and situations
C5 To provide an authentic opportunity for students to develop teamwork and leadership skills.
C6 To achieve innovative results.

SUBJECT EDUCATIONAL EFFECTS

Relating to Knowledge:

PEU_W01: Describes multidisciplinary approach to innovation as a powerful way to incorporate the perspectives of many kinds of people.

PEU_W02: Knows to approach innovation challenges from a human-centered perspective.

PEU_W03: Knows implementation of each step of design thinking process and ideation techniques, to achieve innovative results.

PEU_W04: Knows the Sustainable Development Goals and all targets.

Relating to skill:

PEU_U01: Able to define and re-define innovation challenges by asking the right questions, and not necessarily focusing on the right answers but applying lateral and divergent thinking.
PEU_U02: Able to apply design thinking in wide range of context, from personal to global.
PEU_U03: Able to investigate about design problems and opportunities.
PEU_U04: Able to visually and articulacy explain design and prototyping.

Relating to social competences:

PEU_K01: Is oriented to problem identification and creative problem solving.
PEU_K02: Can effectively collaborate with different people in fast-paced, dynamic, cross-disciplinary team settings.
PEU_K03: Gain a greater acceptance towards dealing with ambiguity and uncertainty in their professional and personal lives.
PEU_K04: Competence to approach many different problems and challenges with an open, creative, empathetic, and prototype-driven mind set.
PEU_K05: Increased confidence in creative abilities.

PROGRAMME CONTENT		
Seminar		**No. of hours**
Sem 1	Pre-course evaluation and Ice Breaker	2
Sem 2	Discussion on Creativity and Teamwork	2
Sem 3	Sustainable Development Goals and effects of our actions	2
Sem 4	Discussion on Design Thinking for Problem Solving & case studies	2
Sem 5		2
Sem 6	Creative Thinking, introduction of SCAMPER, explanation to use of trigger questions and trigger words for SCAMPER	2
Sem 7		2
Sem 8	Pitching Idea and Team Formation	2
Sem 9	Preparing criteria for formulation of problem statement and defining the problem statement	2
Sem 10	Empathize: Observe, record and find the users' need	2
Sem 11	Define: State you users' needs and problems	2
Sem 12	Ideate: use SCAMPER to develop ideas for solving users' problems and cater to their needs	2
Sem 13	Prototyping solution – Mock-ups, Storyboards, Iterations	2
Sem 14	Testing prototype – field feedback and 2nd Iteration	2
Sem 15	Presentation of final solutions	2
	Total hours	30
Project		**No. of hours**
P1	First Iteration of the project, presentations, and discussion	8

P2	Final Iteration of the project and presentations, and discussions	7
	Total hours	15
	Overall total hours for the course	45

TEACHING TOOLS USED
N1 Lecture information N2 Multimedia presentation N3 Flipped classroom N4 Demonstrations N5 Collaboration and group discussion using MS Teams or Slack or similar softward/web-platform N6 Documentation and debriefing N7 Group feedback

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
F1	PEU_K02, PEU_K03, PEU_K04, PEU_K05	Group work during the semester
F2	PEU_U01, PEU_U02, PEU_U03, PEU_U04, PEU_K01	Team presentation
F3	PEU_W01, PEU_W02, PEU_W03, PEU_W04, PEU_K01	Individual course journal
P = F1 * 20% + F2 * 40% + F3 * 40% To pass the course a student is required to collect at least 50% in each F1, F2 and F3 respectively. (3.5 from 55%, 4.0 from 65%, 4.5 from 75%, 5.0 from 85%, 5.5 from 95%)		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

1. Plattner, H., Leifer, L., Meinel, C. (2011). Design Thinking – Understand, Improve, Apply, Springer, Berlin, Heidelberg.
2. Darbellay, F., Moody, Z., Lubart, T. (2017). Creativity, Design Thinking and Interdisciplinarity, Springer, Singapore.
3. Bernhard, S. (2016). Simply Brilliant: Powerful Techniques to Unlock Your Creativity and Spark New Ideas, New York: AMACOM.

SECONDARY LITERATURE:

1. Luchs, M., Griffin, A., Swan, S. (2015). Design Thinking, Wiley-Blackwell.
2. Macanufo, J., Brown, S., Gray, D. (2010). Gamestroming, Sebastopol: O'Reilly Media, Incorporated.
3. Mootee, I. (2013). Design Thinking for Strategic Innovation: What They Can't Teach You at Business or Design School, John Wiley & Sons.
4. Kelley, D. & Kelley, T. (2014). Creative Confidence: Unleashing the Creative Potential Within Us All, New York: William Collins.
5. Roth, B. (2015). The Achievement Habit: Stop Wishing, Start Doing, and Take Command of Your Life, Harper Business.

6. Roger, M. (2013). The Design of Business: Why Design Thinking is the Next Competitive Advantage, Boston: Harvard Business Review Press.
7. Follett, J. (2016). What is Design Thinking ?, O'Reilly [Online], https://www.oreilly.com/ideas/what-is-design-thinking, (Last Accessed – 25th April 2019).
8. VII) Levy, M. (2017) Design Thinking in Multidisciplinary Learning Teams: Insights from Multidisciplinary Teaching Events. In: Metzger, A., Persson, A. (eds) Advanced
9. Information Systems Engineering Workshops. CAiSE 2017. Lecture Notes in Business Information Processing, vol 286. Springer, Cham.

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Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish: Współczesne zarządzanie
Name of subject in English : Contemporary management
Main field of study (if applicable): Business Engineering
Specialization (if applicable): Business Intelligence
Profile: academic
Level and form of studies: 2nd level, full-time
Kind of subject: obligatory
Subject code W08IZZ-SM8026
Group of courses NO

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	**30**				**30**
Number of hours of total student workload (CNPS)	**50**				**50**
Form of crediting	**crediting with grade**				**crediting with grade**
For group of courses mark (X) final course					
Number of ECTS points	**2**				**2**
including number of ECTS points for practical classes (P)					**2**
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)	**1,28**				**1,28**

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

Essentials of management

SUBJECT OBJECTIVES

To ensure fundamental knowledge (including application aspects) about:
C1. the context of contemporary business and dynamics of organizational environment,
C2. digital and networked aspects of modern business
C3. problems and principles of strategic choices,
C4. analyzing of business processes,
C5. managing the organizational change,
To ensure fundamental skills to:
C6. choose, justify and apply the management methods and techniques when complex management and substantive issues in the organization are identified, analyzed and solved.

SUBJECT EDUCATIONAL EFFECTS

Relating to knowledge:

PEU_W01 – student explains and illustrates the impact of global and digital environment on organizational competitiveness and identifies the factors affecting the organizational development.

PEU_W02 – Student recognises the complexity of managerial problems in the organization. Interprets the interdependencies that go beyond separated functions, processes and organization.

PEU_W03 – Student has knowledge of leadership and decision making in the strategic area and the implementation of organizational changes.

relating to skills:

PEU_U01 - Student analyses the causes and dynamics of events and phenomena in the organization as a whole, in the context of their internal and external conditions.

PEU_U02 – Student has the ability to formulate solutions to complex management and substantive problems in the organization.

relating to social competences:

PEU_K01 – Student shows readiness to unassisted to conduct flexible searches and use critical selection of methods and tools in solving problems arising at the workplace.

PEU_K02 – Presents courage in conveying and defending their views. Prepared to persuade and negotiate in order to achieve common goals.

PROGRAMME CONTENT

Lectures		**Number of hours**
Lec1	Introduction	2
Lec2	Modern business environment	2
Lec3	Entrepreneurship, new ventures, and start-ups	2
Lec4	New business models and future organizational designs	2
Lec5	New forms of financing and investment opportunities	2
Lec6	Global production, operations, and supply chain management	2
Lec7	Online business and technology	2
Lec8	Marketing processes and consumer behavior in information society	2
Lec 9	Leadership and decision making in knowledge based economy	2
Lec10	Employee behavior and motivation in liquid modernity	2
Lec11	Knowledge management, innovation and organizational development	2
Lec12	Culture and sensemaking	2
Lec13	Business ethics and social responsibility	2
Lec14	Change managemnet and the future of management	2
Lec15	Final test	2
	Total hours	30

Seminar		**Number of hours**
Semin 1	Introduction	2
Semin 2	Digital aspects of business environment	2

Semin 3	New technology and start-up's ecosystem	2
Semin 4	Networked, virtual and fractal organizational designs	2
Semin 5	FinTech – Financial Technology	2
Semin 6	Global e-commerce	2
Semin 7	Global e-business	2
Semin 8	E-marketing and social media	2
Semin 9	E-leadership and DSS systems	2
Semin 10	Virtual teams and telework	2
Semin 11	Knowledge sharing tools	2
Semin 12	Digital aspects of cultural change	2
Semin 13	CSR systems	2
Semin 15	AI in business	2
Semin 15	Closing seminar	2
	Total hours	30

TEACHING TOOLS USED
N1. Presentations N2. Case studies N3. Discussion N4. Self-study

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
F1	PEU_W01-W03	Self-study
F2	PEU_W01-W03, PEU_K01-K02	Discussion, Case studies
F3	PEU_U01-U02, PEU_K01-K02	Presentation
P(lecture) = F1, P(seminar) = 0,5*F2 + 0,5 F3		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Bovee C.L., Thill J.V., Business in Action, Global Edition, Pearson 2020
[2] Ebert R.J., Griffin R.W., Business Essentials: Global Edition, Pearson 2019
[3] Barringer B.R., Ireland R.D., Entrepreneurship: Successfully Launching New Ventures, Pearson 2019
[4] Osterwalder A., Pigneur Y., Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers, Wiley, 2010.
[5] Wilkinson A., Armstrong S.J., Lounsbury M., Oxford Handbook of Management, Oxford University Press, 2018.

SECONDARY LITERATURE:

[1] Hatch M. J., Cunliffe A. L., Organization Theory (3rd edit), 2013.

[2] McKee A., Management: A Focus on Leaders, 2nd Edition, 2014.
[3] Trott P., Innovation Management and New Product Development, Pearson 2017
[4] Hamel G., What matters now. How to win in a world of relentless change, ferocious competition, and unstoppable innovation, Jossey-Bass, 2012.

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Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish: Fizyka układów złożonych
Name of subject in English: Physics of complex systems
Main field of study (if applicable): Business Engineering
Specialization (if applicable): Business Intelligence
Profile: academic
Level and form of studies: 2nd level full-time
Kind of subject: obligatory
Subject code W08IZZ-SM8027
Group of courses YES

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	**15**		**15**		
Number of hours of total student workload (CNPS)	**25**		**50**		
Form of crediting	**crediting with grade**				
For group of courses mark (X) final course	**X**				
Number of ECTS points	**3**				
including number of ECTS points for practical classes (P)	**2**				
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)	**1,36**				

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Programming skills for example in Python
2. Knowledge of elements of physics, probability and statistics, and skills related to this subject

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SUBJECT OBJECTIVES

C1 The purpose of this introductory course is to give an overview of the basic concepts, models and tools, used in the field of the Complex Systems, i.e. systems of many interacting components. After this course students should understand the essence of complexity and relations between different approaches used for complex systems.

SUBJECT EDUCATIONAL EFFECTS

Related to knowledge:
PEU_W01: He knows and understands advanced models, methods and IT tools, especially simulation tools used to solve management decision-making problems.
In the field of skills:
PEU_U01: Can describe selected issues encountered in everyday and professional life using mathematical and physical formalism and draw conclusions
In the field of social competences:
PEU_K01: Is able to take an active part in discussions and work in a group

PROGRAMME CONTENT		
Lecture		**Number of hours**
Lec 1	Presentation of the requirements and grading. Introduction: what is a Complex system and how it can be modeled?	1
Lec 2	From mikro to makro: Equilibrium, Entropy, Ehrenfest model	2
Lec 3	Percolation model	2
Lec 4	Ising Model	2
Lec 5	Elements of phase transitions theory	2
Lec 6	Complex networks: models and processes on networks	2
Lec 7	Power laws around us and models of self-organized criticality	2
Lec 8	Social complex systems: models of opinion dynamics and diffusion of innovation	2
	Total hours	15

Laboratory		**Number of hours**
Lab 1	Presentation of the requirements and grading.	1
Lab 2	Monte Carlo Simulations	3
Lab 3	Simulation of the Percolation model	4
Lab 4	Metropolis Monte Carlo simulation of the Ising model	4
Lab 5	Complex networks: models and visualization (NetworkX package for Python)	3
	Total hours	15

TEACHING TOOLS USED
N1. Traditional lecture N2. Multimedia presentation N3. Computer laboratory – PC computer with Python.

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
F1	PEU_W01, PEU_U01	Project report
F2	PEU_W01, PEU_U01 PEU_K01	Laboratory assignments
P=0,5*F1+0,5*F2		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

1.Albert-László Barabási, “Network Science”, Cambridge University Press 2016

2. Nino Boccara, “Modeling Complex Systems”, 2nd Edition, Springer-Verlag New York Inc. 2010

3. Nicholas R. Moloney, Kim Christensen, “Complexity and Criticality”, Imperial College Press 2005

SECONDARY LITERATURE:

1. David P. Landau, Kurt Binder, “A Guide to Monte Carlo Simulations in Statistical Physics”, 4th Edition, Cambridge University Press 2014
2. Mark Newman, “Networks: An Introduction”, Oxford University Press 2010
3. Stefan Thurner, Rudolf Hanel, and Peter Klimek, “Introduction to the Theory of Complex Systems”, Oxford University Press 2018
4. Mark E. J. Newman, G. T. Barkema, “Monte Carlo Methods in Statistical Physics”, Oxford University Press 1999

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Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish: Analityka opisowa
Name of subject in English Descriptive analytics
Main field of study (if applicable): Business Engineering
Specialization (if applicable): Business Intelligence
Profile: academic
Level and form of studies: 2nd level, full-time
Kind of subject: obligatory
Subject code W08IZZ-SM8028
Group of courses NO

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	**30**		**30**		
Number of hours of total student workload (CNPS)	**100**		**50**		
Form of crediting	**Examination**		**crediting with grade**		
For group of courses mark (X) final course					
Number of ECTS points	**4**		**2**		
including number of ECTS points for practical classes (P)			**2**		
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)	**1,36**		**1,28**		

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. 1. Basic knowledge of probability theory

SUBJECT OBJECTIVES

C1 Knowledge and understanding of the statistical methods used for data description and inferences
C2 Education skills of data descriptions
C3 Education of skills of data analysis

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:
PEU_W01 – Knows how to describe and approximate the distribution of a random variable. Understands how to apply the theory to empirical problems.
PEU_W02 – Knows methods of modeling continuous data with a linear and a non-linear regression model. Understands how to apply the theory to empirical problems.
PEU_W03 – Knows methods of modeling discrete data. Understands how to apply the theory to empirical problems.
Relating to skills:

PEU_U01 - Understands and is able to use theoretical knowledge in statistics to describe the properties of the data and analyze the relationship between variables.
PEU_U02 - Understands and is able to use theoretical knowledge in statistics and econometrics to infer from the data about social or economic processes
Relating to social competences:
PEU_K01 - Can prepare in a small group solutions to practical statistical problems and present the results of the analysis

PROGRAMME CONTENT		
Lecture		**Number of hours**
L1	Introduction; Data types	2
L2	Measures of dispersion and location	2
L3	Approximation of the distribution of the data – kernel estimation	2
L4	Modeling relationship between variables: descriptive analysis (correlation), graphical presentation (scatterplot) and regression	2
L5-6	Least Square (LS) estimation method - constrained and unconstrained optimization	4
L7-8	Application of LS to a linear regression model: model specification and verification	4
L9-10	Application of LS to a nonlinear regression model (Smooth Transition Regression)	4
L11	Principal component (PC) method – reduction of the data dimension	2
L12-13	Regularization methods (LASSO)	4
L14-15	Probit/logit models of binominal data	4
	Total	**30**
Laboratory		**Number of hours**
Lab1	Introduction to Matlab (scripts, functions)	2
Lab2	Loading and visualization of the data	2
Lab3	Measures of dispersion and location	2
Lab4	Approximation of the distribution of the data – kernel estimation	2
Lab5	Modeling relationship between variables: descriptive analysis (correlation), graphical presentation (scatterplot) and regression	2
Lab6-8	Application of LS to a linear regression model: model specification and verification, restrictions	6

Lab9-10	Application of LS to a nonlinear regression model (Smooth Transition Regression)	4
Lab11-13	Shrinkage methods: Principal components (PC) , LASSO	6
Lab 14-15	Probit/logit models of binominal data	4
	TOTAL HOURS	30

TEACHING TOOLS USED
Lectures N1. Multimedia presentation N2. Solving of exemplary problems Laboratories N3.matlab and R environment N4. Multimedia presentation

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
F1	PEU_W01, PEU_W02, PEU_W03	Exam, in a scale 2-5.5
F2—F6	PEU_U01, PEU_U02, PEU_K01	Assignments 1-5, expressed in percentage points (%)
P(Lecture) = F1 P(Lab) = (F2+F3+F4+F5+F6)/5 - computed in percentage points (%), transformed into the scale 2-5.5		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Peck, Olsen, Devore, (2015), *Introduction to statistics and data analysis*, Cengage Learning, Inc.

SECONDARY LITERATURE:

[1] Greene W.H. (2019), *Econometric Analysis*, Pearson Education Limited
[2] Wooldridge, J.M. (2014), *Introductory Econometrics : A Modern Approach*, South Western Educational Publishing
[3] Heiss F. (2016), *Using R for Introductory Econometrics*, CreateSpace Independent Publishing Platform
[4] Gordon S.I., B. Guilfoos (2017), *Introduction to Modeling and Simulation with MATLAB® and Python*, CRC Press

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Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish: Pracownia Inteligencji Biznesowej
Name of subject in English: Business Intelligence Workplace
Main field of study (if applicable): Business Engineering
Specialization (if applicable): Business Intelligence
Profile: academic
Level and form of studies: 2nd level, full-time
Kind of subject: obligatory
Subject code W08IZZ-SM8029
Group of courses YES

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	**15**		**30**	**15**	
Number of hours of total student workload (CNPS)	**25**		**50**	**50**	
Form of crediting	**Crediting with grade**				
For group of courses mark (X) final course	**X**				
Number of ECTS points	**5**				
including number of ECTS points for practical classes (P)	**4**				
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)	**2,64**				

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

Basic computer programming skills (e.g., C ++, Excel / VBA, Julia, Matlab, Netlogo, Python) and understanding of fundamental statistical methods.

SUBJECT OBJECTIVES

C1 Mastering programming skills useful for business intelligence applications.

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:

PEU_W01 Knows computational environments useful for business intelligence applications.

PEU_W02 Knows the basic and selected advanced modeling and forecasting tools and knows how to use them for descriptive, predictive and prescriptive analytics.

relating to skills:

PEU_U01 Is able to use selected computational environments to perform specific business intelligence tasks.

PEU_U02 Is able to implement simple and apply selected advanced modeling and forecasting techniques.

relating to social competences:

PEU_K01 Is aware of the need for independent, critical assessment of the scope and level of knowledge in the field of business intelligence. Is prepared to independently search for knowledge in this area.

PROGRAMME CONTENT		
Lecture		**Number of hours**
Lec 1	Introduction to the Business Intelligence Workplace	3
Lec 2-3	Time series graphics	4
Lec 4-5	The forecaster's toolbox	4
Lec 6-7	Agents, what-if scenarios and decision support	4
	Total hours	15

Laboratory		**Number of hours**
Lab 1	Introduction to the Business Intelligence Workplace	2
Lab 2-3	Basics of selected computing environments	4
Lab 4-5	Time series graphics: Time and seasonal plots	4
Lab 6-7	Time series graphics: Plotting dependence	4
Lab 8-9	The forecaster's toolbox: Naïve forecasts	4
Lab 10-11	The forecaster's toolbox: Simple regression models	4
Lab 12-13	Decision support: From predictive to prescriptive analytics	4
Lab 14-15	Agents and what-if scenarios	4
	Total hours	30

Project		**Number of hours**
Proj 1	Descriptive or predictive analytics project: Introduction	3
Proj 2-3	Descriptive or predictive analytics project: Implementation	4
Proj 4-5	Predictive or prescriptive analytics project: Introduction	4
Proj 6-7	Predictive or prescriptive analytics project: Implementation	4
	Total hours	15

TEACHING TOOLS USED
N1. Multimedia presentations (lectures). N2. Computational tasks in Julia, MATLAB/Octave, Python or R (computer lab). N3. Case studies (projects).

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming	Learning outcomes	Way of evaluating learning outcomes achievement

during semester), P – concluding (at semester end)		
F1	PEU_W01, PEU_W02	In-class activity
F2	PEU_U01, PEU_U02, PEU_K01	Project reports
F3	PEU_U01, PEU_U02, PEU_K01	Lab tasks
P = F1+F2+F3 - computed in percentage points (%), transformed into the scale 2-5.5		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] J. Camm, J. Cochran, M. Fry, J. Ohlmann, D., Anderson, D. Sweeney, T. Williams (2019) *Business analytics*, Cengage

[2] C. Vercellis (2009) *Business intelligence: data mining and optimization for decision making*, Wiley

SECONDARY LITERATURE:

[1] J. Eaton, D. Bateman, S. Hauberg, R. Wehbring. (2021) *GNU Octave Manual: Free Your Numbers*

[2] A. Ferrari, M. Russo (2016) *Introducing Microsoft Power BI*, Microsoft Press

[3] S. Gordon, B. Guilfoos (2017) *Introduction to Modeling and Simulation with MATLAB and Python*, CRC Press

[4] G. Grolemund, H. Wickham (2017) *R for Data Science*, O'Reilly

[5] D. Hiebeler (2015) *R and MATLAB*, Chapman and Hall/CRC

[6] R. Sharda, D. Delen, E. Turban (2020). Analytics, Data Science & Artificial Intelligence: Systems for decision support, Pearson

[7] J. Storopoli, R. Huijzer, L. Alonso (2021) *Julia Data Science*, https://juliadatascience.io

[8] J. VanderPlas (2017) *Python Data Science Handbook*, O'Reilly

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Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish: Analityka wizualna
Name of subject in English: Visual Analytics
Main field of study (if applicable): Business Engineering
Specialization (if applicable): Business Intelligence
Profile: academic
Level and form of studies: 2nd level, full-time
Kind of subject: obligatory
Subject code W08IZZ-SM8030
Group of courses YES

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	**15**		**15**	**15**	
Number of hours of total student workload (CNPS)	**25**		**25**	**25**	
Form of crediting			**crediting with grade**		
For group of courses mark (X) final course			**X**		
Number of ECTS points			**3**		
including number of ECTS points for practical classes (P)			**1**		
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)			**2,04**		

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Basic knowledge of data mining methods and techniques.
2. Basics of statistical and data visualization software.

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SUBJECT OBJECTIVES

C1 Learning advanced algorithms for visual analytics.
C2 Learning advanced data mining techniques, including clustering and grouping algorithms.
C3 Acquiring data reporting skills through the use of advanced data visualization.
C4 Mastering business modelling techniques and analysis techniques to turn data into useful insights in the management process.

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:
PEU_W01 The student has knowledge of the methods and techniques of modern analytics useful in management decision-making processes.
PEU_W02 The student has knowledge of computer decision support tools as well as data visualization and reporting systems.
relating to skills:
PEU_U01 The student is able to properly select data mining techniques and apply them to data analysis.

PEU_U02 The student is able to properly select and apply selected information technologies in order to visualize data and prepare a data report
relating to social competences:
PEU_K01 The student is able to interact and work in a group, appropriately dividing the tasks to be performed among individual group members.
PEU_K02 The student is able to independently develop his knowledge and skills, is ready to identify, analysis and solve problems in the identification and analysis of decision problems with the help of data mining, visualization and reporting .

PROGRAMME CONTENT		
Lecture		**Number of hours**
Lec 1	Introduction to the methodology and practice of applying modern techniques of data mining, analysis, visualization and reporting. Data visualization in Tableau and R.	1
Lec 2, 3	Visualizing descriptive statistics and forecasts. Data preparation. Differences between data analysis and presentation. Iterative process of data mining.	4
Lec 4, 5, 6	Visualizing clustering and grouping. Algorithms and evaluation methods.	6
Lec 7	Spatial and multidimensional visualization. Utilizing decision trees.	2
Lec 8	Visualization as an analytical tool. Description, data analysis, interpretation and drawing conclusions based on data - rules, errors, examples. Good practices of data visualization.	2
	Total hours	**15**

Laboratory		**Number of hours**
Lab 1	Overview of a design task. Data visualization in Tableau and R.	1
Lab 2, 3	Visualizing descriptive statistics and forecasts. Data preparation. Differences between data analysis and presentation. Iterative process of data mining.	4
Lab 4, 5	Visualizing clustering and grouping. Algorithms and evaluation methods.	4
Lab 6, 7	Spatial and multidimensional visualization. Utilizing decision trees.	4
Lab 8	Visualization as an analytical tool. Description, data analysis, interpretation and drawing conclusions based on data - rules, errors, examples. Good practices of data visualization. Discussion of the final projects.	2
	Total hours	**15**

Project		**Number of hours**
Pro 1	Principles of the final task. Data visualization in Tableau and R. Work with dedicated software.	1
Pro 2, 3	Visualizing descriptive statistics, data preparation. Data analysis and presentation. Work with dedicated software.	4
Pro 4, 5	Visualizing clustering and grouping. Work with dedicated software.	4

Pro 6	Spatial and multidimensional visualization. Decision trees - work with dedicated software.	2
Pro 7, 8	Visualization, description, data analysis, interpretation and drawing conclusions based on data - rules, errors, examples. Discussion of the final projects.	4
	Total hours	**15**

TEACHING TOOLS USED
N1. Multimedia presentations. N2. Data collection. N3. Computer data analysis - software: Tableau, R. N4. Teaching materials published on eportal. N5. Teamwork - group project. N6. Optionally alternative software packages: PowerBI, Alteryxa, Board, Weka

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
F1	PEU_W01, W02	Based on project reports
F2	PEU_U01, U02 PEU_K01, K02	Project reports
P = F1 + F2 - computed in percentage points (%), transformed into the scale 2-5.5		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Nussbaumer Knaflic C., (2015) Storytelling with Data: A Data Visualization Guide for Business Professionals, J. Wiley & Sons
[2] Sharda R., Delen D., Turban E., (2015) Business Intelligence and Analytics. Systems for Decision Support, Pearson
[3] Larose D.T., (2014) Discovering Knowledge in Data: An Introduction to Data Mining, J. Wiley & Sons

SECONDARY LITERATURE:

[1] Yau N., (2013) Data points. Visualization that means something, J. Wiley & Sons
[2] Loth A., (2019) Visual Analytics with Tableau, J. Wiley & Sons
[3] Zumel N., Mount J., (2019) Practical Data Science with R, 2nd ed, Black&white.
[4] Morzy T., (2013) Eksploracja danych. Metody i algorytmy, WN PWN
[5] Evans J.R., (2016) Business Analytics. Methods, Models, and Decisions, Pearson
[6] Larose D.T., (2005) Discovering Knowledge in Data. An Introduction to Data Mining, J. Wiley & Sons
[7] Surma J., (2009) Business Intelligence. Systemy wspomagania decyzji biznesowych, WN PWN
[8] Wilke C.O., (2020) Podstawy wizualizacji danych: zasady tworzenia atrakcyjnych wykresów, Helion
[9] Provost F., Fawcett T., (2015) Analiza danych w biznesie. Sztuka podejmowania skutecznych decyzji, Helion
[10] Stephenson D., (2019) Big Data. Nauka o danych i AI bez tajemnic, Helion
[11] Foreman J.W., (2017) Mistrz analizy danych. Od danych do wiedzy, Helion

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Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish Pozyskiwanie i analiza danych stron www
Name of subject in English Web scraping and data analysis
Main field of study (if applicable): Business Engineering
Specialization (if applicable): Business Intelligence
Profile: academic
Level and form of studies: 2nd level, full-time
Kind of subject: obligatory
Subject code W08IZZ-SM8031
Group of courses YES

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	**30**		**15**		
Number of hours of total student workload (CNPS)	**50**		**25**		
Form of crediting			**crediting with grade**		
For group of courses mark final course with (X)			**X**		
Number of ECTS points			**4**		
including number of ECTS points for practical classes (P)			**2**		
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)			**1,96**		

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Basic knowledge and ability to use R program
2. Basic knowledge of HTML and CSS

SUBJECT OBJECTIVES

C1: Technical knowledge necessary to quickly obtain a large amount of data, automate this process.
C1: Mastering the ability to process such data into useful information supporting management processes.
C3: Mastering the ability to use the R program throughout the process: from data acquisition to analysis

SUBJECT EDUCATIONAL EFFECTS

Relating to knowledge:
PEU_W01: Basic knowledge to obtain and analyze data from websites.
Relating to skills:
PEU_U01: Ability to design and implement a procedure for obtaining data from websites, and then apply statistical methods to analyze such data.

PROGRAM CONTENT		
Lectures		**Number of hours**
Lec1	Course assessment criteria. The Internet as a source of data supporting decision-making processes	1
Lec1-2	Review and expansion of R language topics	3
Lec3	*Tidyverse* ecosystem packages	2
Lec4	Functional programming	2
Lec5	Methods of text data processing (strings)	2
Lec6	Pattern searching, regular expressions	2
Lec7	Models and techniques for data extraction	2
Lec8-9	Parsing web pages	3
Lec9-10	Creating web crawlers. Case study	3
Lec11-12	Parsing dynamic web pages	4
Lec13-14	Data extraction through API	4
Lec15	Written exam	2
	Total hours	**30**

Laboratory		**Number of hours**
Lab1	Course assessment criteria. Rules and safety procedure for laboratory. R as a web scraping environment	1
Lab2	Selected data operations, functional programming, visualization	2
Lab3	String processing, regular expressions	2
Lab4	Task discussion: string processing using a selected web page example	1
Lab4-7	Creating web crawlers for a chosen decision-making problem. Report preparation	7
Lab8	Discussion and report review	2
	Total hours	**15**

TEACHING TOOLS USED
N1. Presentation N2. Solving problems, case study

N3. Statistical program R, scripts in R

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming (during semester), P – concluding (at semester end)	Learning outcomes number	Way of evaluating learning outcomes achievement
F1	PEU_W01	Written test
F2	PEU_U01	Assignment
F3	PEU_U01	Report
P = 0.3×F1 + 0.7×(0.3×F2 + 0.7×F3)		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Kapłon R. *Lecture notes* [available on ePortal/Teams]
[2] Mitchell R. *Web Scraping with Python*, 2nd Edition, O'Reilly Media, 2018.
[3] Wickham H., Çetinkaya-Rundel M., Grolemund G., *R for Data Science*, 2nd Edition, O'Reilly Media, 2023.

SECONDARY LITERATURE:

[4] Aydin O. *R Web Scraping Quick Start Guide*, Packt Publishing, 2018.
[5] Fitzgerald M. *Introducing Regular Expressions*, O'Reilly Media, 2012.

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

Dr inż. Robert Kapłon; robert.kaplon@pwr.edu.pl

Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish: Seminarium dyplomowe
Name of subject in English: Diploma seminar
Main field of study: Business Engineering
Specialization: Business intelligence
Profile: academic
Level and form of studies: 2nd level, full-time
Kind of subject: obligatory
Subject code W08IZZ-SM8032
Group of courses NO

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)					**15**
Number of hours of total student workload (CNPS)					**50**
Form of crediting					**crediting with grade**
For group of courses mark (X) final course					
Number of ECTS points					**2**
including number of ECTS points for practical classes (P)					**2**
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)					**0,68**

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Cross-sectional knowledge of issues from the previous course of study
2. General knowledge of the subjects pursued in the course of study

SUBJECT OBJECTIVES

C1 To prepare students for the preparation of a Master's thesis according to the requirements.
C2 To acquire the ability to formulate the aim of the thesis and to plan its structure.
C2 To acquire the skills of writing the thesis in terms of using literature sources, carrying out the work and interpreting the results, taking into account editorial recommendations.
C3 To improve the ability to present one's own ideas, concepts and planned solutions.
C4 To consolidate skills of creative discussion in which one can justify and defend one's position in substantive manner.
C5 To prepare for the diploma exam.

SUBJECT EDUCATIONAL EFFECTS

relating to skills:
PEU_U01 Is able to identify a managerial problem and plan its solution using appropriate methods, techniques and tools.
PEU_U02 Can prepare a presentation containing an analysis of results and problem solution concepts.

PEU_U03 Can reason in a discussion, justify ideas and solutions of his/her own and others, as well as critically evaluate and plan actions and solutions of his/her own and others.

PROGRAMME CONTENT

Seminar		Number of hours
Semin 1	Introduction to the seminar. Discussing the class rules and the scoring/grading policy.	1
Semin 2	Overview of university and departmental requirements for thesis. Overview of the process and timeline for graduation. Principles of formulating the topic and purpose of the thesis, adequately to the indicated managerial problem. Examples of good and bad thesis topics/objectives. Discussion of the thesis statement template. Topic, purpose, scope, structure.	2
Semin 3	Overview of the construction of the paper - table of contents, introduction and conclusion. Common mistakes in the work. Referencing and discussion of the progress in choosing a topic and supervisor.	2
Semin 4	Overview of editing requirements. Discussion of how to access literature databases and how to use, analyze, and cite literature sources. Consultation of the first version of the thesis statement. Assignment of dates for individual presentations.	2
Semin 5	Discussion of the criteria for the final evaluation of the work (review form). The concept of plagiarism; anti-plagiarism system. Approval of the final version of the thesis statement. Referring, consulting and discussing problems and progress in the thesis. Presenting recommendations on how to present the progress of the thesis during the next classes.	2
Semin 6	Discussion of the diploma exam. Examination topics and questions. Referencing, consultation and discussion of problems and progress of the thesis. Individual presentations of progress and further plans for completion of the thesis (1). Discussion.	2
Semin 7	Individual presentations of progress and further plans for completion of the thesis (2). Discussion.	2
Semin 8	Individual presentations of progress and further plans for completion of the thesis (3). Discussion.	2
	Total hours	15

TEACHING TOOLS USED

N1.	Presentations of selected issues related to the thesis topic.
N2.	Multimedia presentations - own and foreign (positive and negative examples).
N3.	Problem discussion, recognizing advantages and criticizing disadvantages of solutions.

N4. Individual consultations of students' problems connected with planning and progress of the work

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
F1	PEU_U01	Timely submission and evaluation of a working statement of work (topic, purpose, problem, concept, initial structure)
F2	PEU_U02	Evaluation of the preparation and presentation of the progress of the thesis and plans for further activities.
F3	PEU_U03	Participation in the discussion.
P = 0,3*F1 + 0,5*F2 + 0,2*F3		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

Literature related to the problems of the thesis - independently selected and recommended by the thesis supervisor.

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

Bożena Mielczarek Bozena.Mielczarek@pwr.edu.pl
Wiesław Dobrowolski Wieslaw.Dobrowolski@pwr.edu.pl

Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish Warsztat badacza
Name of subject in English Research workshop
Main field of study (if applicable): Business Engineering
Specialization (if applicable): Business Intelligence
Profile: academic
Level and form of studies: 2nd level magister studies, full-time
Kind of subject: obligatory
Subject code W08IZZ-SM8033
Group of courses NO

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)					**15**
Number of hours of total student workload (CNPS)					**25**
Form of crediting					crediting with grade
For group of courses mark (X) final course					
Number of ECTS points					**1**
including number of ECTS points for practical classes (P)					**1**
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)					**0,68**

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Basic knowledge of the paradigms and theories of management and quality sciences.
2. Knowledge of basic methodological problems.

SUBJECT OBJECTIVES

C1: Acquiring the knowledge necessary to conduct research and publishing the results of this research.
C2: Acquiring the ability to apply knowledge in practice for the design, implementation and description of empirical research, critical analysis of literature and editing of scientific texts.

SUBJECT EDUCATIONAL EFFECTS/ SUBJECT LEARNING OUTCOMES

Relating to knowledge:
PEU_W01 student knows the methods of conducting scientific research.
PEU_W02 student knows the scientific bases that should be the basis for the analysis of literature.
PEU_W03 student knows the structure of a scientific article and the path of its publication.
relating to skills:
PEU_U01 student can make a critical analysis of literature

PEU_U02 student can search scientific databases for targeted information. PEU_U03 student can write a scientific article.

PROGRAMME CONTENT		
Seminar		**Number of hours**
Sem1	Introduction – methods of conducting scientific research	1
Sem2	Methods of searching and acquiring scientific knowledge	2
Sem3	What, how and where could be published?	2
Sem4	Scientific research – characteristic, structure and editing requirements.	2
Sem5	Presentation of scientific research and public speech	2
Sem6	Methods of conducting a critical analysis of the literature - a review	2
Sem7	Methods of designing, implementing and describing empirical research - a review	2
Sem8	Crediting with a grade	2
	Total	**15**

TEACHING TOOLS USED
N1. Multimedia presentation N2. N3.

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
F1	PEU-W01-W03 PEU-U01-U03	Presentation of the chosen scientific paper prepared and presented by the student
P = F1		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Jonker, J., & Pennink, B. (2010). The essence of research methodology: A concise guide for master and PhD students in management science. Springer Science & Business Media.

[2] Taylor, B., Sinha, G., & Ghoshal, T. (2006). Research methodology: A guide to for reseachers in management and social sciences. PHI Learning Pvt. Ltd..

[3] Czakon, W. (Ed.). (2011). Podstawy metodologii badań w naukach o zarządzaniu. Wolters Kluwer Polska.

SECONDARY LITERATURE:

[1] Becker, H. S. (2008). Writing for social scientists: How to start and finish your thesis, book, or article. University of Chicago Press.

[2] Scandura, T. A., & Williams, E. A. (2000). Research methodology in management: Current practices, trends, and implications for future research. Academy of ManagementJjournal, 43(6), 1248-1264.

[3] Juszczyk, S. (2013). Badania jakościowe w naukach społecznych szkice metodologiczne. Katowice, Poland: Wydawnictwo Uniwersytetu Śląskiego.

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

dr hab. inż. Katarzyna Tworek, prof. uczelni, katarzyna.tworek@pwr.edu.pl

Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish:	**Praca dyplomowa**
Name of subject in English:	**Diploma Thesis**
Main field of study:	**Business Engineering**
Specialization:	**Business Intelligence**
Profile:	**academic**
Level and form of studies:	**2nd level, full-time**
Kind of subject:	**obligatory**
Subject code:	**W08IZZ-SM8034**
Group of courses:	**NO**

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)					12
Number of hours of total student workload (CNPS)					350
Form of crediting					crediting with grade
For group of courses mark (X) final course					
Number of ECTS points					14
including number of ECTS points for practical classes (P)					14
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)					3,48

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1 Cross-cutting knowledge of issues in the course of study

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SUBJECT OBJECTIVES

C1 To synthesize knowledge from the entire course of study and practical skills, especially in the field of the selected specialization.
C2 To consolidate skills of acquiring and using scientific and technical information.
C3 To achieve proficiency in diagnosing management systems and designing solutions to managerial problems.
C4 To develop in a compact form a work (diploma thesis) on the basis of knowledge gained during studies, literature information, analytical and design work, including the results of research work.

SUBJECT EDUCATIONAL EFFECTS

relating to skills:

PEU_U01 Is able to make in-depth analysis of working or designed process in organization or phenomena and systems in the field of management and indicate dysfunctions and/or needs for improvement.

PEU_U02 Can gather and analyze information from various sources in the field of management.
PEU_U03 Can correctly indicate, select and apply basic methods, techniques and tools to solve a managerial problem.
PEU_U04 Can correctly identify a managerial problem and plan its solution using appropriate methods, techniques and tools, as well as guide others in the training and implementation of proposed solutions.
PEU_U05 Can prepare a professional work - a comprehensive text presenting in a rigorous way the results of analytical, design and research work.

PROGRAMME CONTENT

Project		Number of hours
Sem1	Analysis of the organization (or phenomenon, system) that is the subject of the paper. Identification, analysis of the problem and assumptions, research theses.	1
Sem 2	In-depth literature analysis of issues addressed in the thesis, including methods, techniques, and tools used to solve problems of a particular class.	2
Sem 3	Analytical and research work.	6
Sem 4	The analysis of the results obtained, of the feasibility and desirability of their implementation, of the schedule, of the expected effects and economics.	1
Sem 5	To determine the direction of future work on the issue included in the scope of the thesis.	1
Sem 6	Thesis Editing	1
	Total hours	12

TEACHING TOOLS USED

N1. Literature study.
N2. Interviews with employees of the organization that is the subject of the study.
N3. Research methods appropriate to the topic of the work, e.g. surveys.
N4. Own analytical and creative work.
N5. Individual consultations.

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
F1	PEU_U01-PEU_U05	Ongoing evaluation of systematic work and partial performance.
F2	PEU_U01-PEU_U05	Final evaluation of the finished work (thesis).
P = 0,5*F1 + 0,5*F2		

PRIMARY AND SECONDARY LITERATURE
PRIMARY LITERATURE: Literature related to the problems of the thesis - independently selected and recommended by the thesis supervisor.
SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)
Name.ForenameOfSupervisor@pwr.edu.pl

Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish: Symulacje w biznesie
Name of subject in English: Business simulation
Main field of study (if applicable): Business Engineering
Specialization (if applicable): Business Intelligence
Profile: academic
Level and form of studies: 2nd level full-time
Kind of subject: obligatory
Subject code W08IZZ-SM8035
Group of courses YES – lecture, laboratory; NO - project

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	**15**		**30**	**15**	
Number of hours of total student workload (CNPS)	**25**		**75**	**50**	
Form of crediting			**crediting with grade**	**crediting with grade**	
For group of courses mark final course with (X)			**X**		
Number of ECTS points			**3**	**2**	
including number of ECTS points for practical classes (P)			**3**	**1**	
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)			**1,96**	**0,68**	

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Ability to model in an Excel spreadsheet
2. Basic knowledge of probability theory and mathematical statistics
3. Knowledge of basic concepts of simulation modeling

SUBJECT OBJECTIVES

C1 - To familiarize students with the principles of building simulation models, in particular Monte Carlo, discrete event and agent-based models
C2– Developing skills in using simulation models to describe the current state and forecast future states of organizations
C3 - To develop skills in solving complex management decision problems using computer simulation experiments

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:

PEU_W01. Knows advanced methods and computer simulation tools for identifying and modeling complex management decision-making processes. Has in-depth knowledge of selected simulation methods supporting decision making in a variable or uncertain environment.

relating to skills:

PEU_U01. Can choose the right simulation method and build a simulation model. Can plan and carry out computer simulation experiments. Is able to use simulation models in solving complex management decision problems
relating to social competences:
PEU_K01 Understand the essence of business ethics
PEU_K02 Is able to cooperate and work in groups and teams

PROGRAM CONTENT		
Lectures		**Number of hours**
Lec 1	Presentation of the requirements and grading. Introduction to simulation modeling. Definitions and concepts. Review of management simulation methods.	1
Lec 2	The framework of the simulation study. Monte Carlo method. Sampling methods.	2
Lec 3	Discrete event simulation – process modeling	2
Lec 4	Discrete event simulation – process modeling	2
Lec 5	Application of agent-based modeling in social sciences	2
Lec 6	Agent-based modeling – model of segregation	2
Lec 7	Agent-based modeling – model of innovation diffusion	2
Lec 8	Agent-based modeling – model of spreading disease	2
	Total hours	**15**

Laboratory		**Number of hours**
Lab 1	Requirements and grading. Objectives of the subject. Simple Monte Carlo (MC) simulations	2
Lab 2	MC model: discrete and continuous distributions. Case no 1	2
Lab 3	MC Model: project management. Case no 2	2
Lab 4	Discrete event simulation. Introduction	2
Lab 5	Discrete event simulation. Case no 3	2
Lab 6	Discrete event simulation. Case no 4	2
Lab 7	Discrete event simulation. Case no 5	2
Lab 8	DES model defense and presentation	2
Lab 9	Introduction to NetLogo - commands and procedures	2
Lab 10	Analysis of examples in the NetLogo Models Library – part 1	2
Lab 11	Analysis of examples in the NetLogo Models Library – part 2	2

Lab 12	Model development cycle in Netlogo	2
Lab 13	Sheep and wolves example	2
Lab 14	Usage of behavior space	2
Lab15	Final report	2
	Total hours	**30**

Project		**Number of hours**
P1	Presentation of the requirements and grading	1
P 2	Review of a chosen model	2
P 3	Choosing a model to modify; Model modification	2
P4	Development of own model, part 1	2
P5	Development of own model, part 2	2
P6	Development of own model, part 3	2
P7	Evaluation of the author's model	2
P8	Evaluation of the author's model	2
	Total hours	**15**

TEACHING TOOLS USED
N1. Multimedia presentation N2. NetLogo N3. Microsoft Excel spreadsheet N4. Arena Rockwell Software

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming (during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
F1	PEU_U01, PEU_K01 PEU_K02	Task 1 (Models MC)
F2	PEU_U01, PEU_K01 PEU_K02	Task 2 (Models DES)
F3	PEU_U01, PEU_K01 PEU_K02	Task 3 (ABM models)
F4	PEU_U01, PEU_K01 PEU_K02	Task 4 (Project)
F5	PEU_W01	Mini tests
P (lecture) = P(lab) P (lab) = 0,3*presence+0.7* average(F1,F2,F3,F5) P (project) = F4		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Law A., Kelton W.D., *Simulation modeling and analysis*, McGraw Hill Higher Education 2007
[2] Winston L.W., *Microsoft Excel 2019 Data Analysis and Business Modeling.* Microsoft Press US, 2019
[3] Wilensky U., Rand W. Natural, Social, and Engineered Complex Systems with NetLogo, The MIT Press, 2015

SECONDARY LITERATURE:

[1] Mielczarek B., *Modelowanie symulacyjne w zarządzaniu. Symulacja dyskre*tna. Oficyna Wydawnicza PWr Wrocław 2009
[2] Hamill, L., Gilbert, N. Agent-Based Modelling in Economics, 2016 John Wiley & Sons, Ltd.

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

Bożena Mielczarek **Bozena.Mielczarek@pwr.edu.pl**
Anna Kowalska-Pyzalska **Anna.Kowalska-Pyzalska@pwr.edu.pl**

Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish: Współczesne problemy ekonomii
Name of subject in English: Contemporary economics
Main field of study (if applicable): Business Engineering
Specialization (if applicable): Business Intelligence
Profile: academic
Level and form of studies: 2nd level, full-time studies
Kind of subject: obligatory
Subject code W08IZZ-SM8036G
Group of courses YES

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	**15**			**15**	
Number of hours of total student workload (CNPS)	**25**			**25**	
Form of crediting				**crediting with grade**	
For group of courses mark (X) final course				**X**	
Number of ECTS points				**1**	
including number of ECTS points for practical classes (P)				**1**	
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)				**1,36**	

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. No requirements

SUBJECT OBJECTIVES

C1- The ability to identify and analyze factors influencing economic choices at the microeconomic level.
C2- Understanding macroeconomic processes in the context of economic growth and development.

SUBJECT EDUCATIONAL EFFECTS

The scope of knowledge:

PEU_W01 Students knows the place of economics in the sciences, and of the substantive and methodological links with other scientific disciplines. The student understands the basic macroeconomic theories.

PEU_W02 Students knows the circumstances and depending on macroeconomic growth and development of the national economy and the world. Knows the basic economic tools and regulations on the national economy, the economies of integration groups globally.

The range of skills:

PEU_U01 Student understands and is able to use theoretical knowledge in economics and related disciplines to analyze and interpret problems in macroeconomic management.

PEU_U02 Student has the ability to identify, understand and analyze the macroeconomic factors

in the context of the policy as part of the macroeconomic and business environment. The scope of social competence: PEU_K01Student can discuss possible solutions to the practical functioning of the economy at the macroeconomic level, to justify the view presented by analyzing the benefits and risks of particular solutions.

PROGRAMME CONTENT		
Lecture		**Number of hours**
Lec 1	Introduction. Basics of economics	**2**
Lec 2	Market law of supply and demand, price elasticity of demand, applications	**2**
Lec 3	Behavior of companies- production costs	**2**
Lec 4	Market structures	**2**
Lec 5	Measures of economic activity. Business cycle	**2**
Lec 6	Money and inflation	**2**
Lec7,Lec8	Labor market and unemployment	**3**
	Total hours	**15**

Project		**Number of hours**
Proj 1	Introduction. Assessment criteria	**2**
Proj 2	Market law of supply and demand, price elasticity of demand, applications.	**2**
Proj 3	Behavior of companies- production costs	**2**
Proj 4	Market structures	**2**
Proj 5	Measures of economic activity. Business cycle	**2**
Proj 6	Money and inflation	**2**
Proj 7	Labor market and unemployment	**2**
Proj 8	Issuing grades	**1**
	Total hours	**15**

TEACHING TOOLS USED
N1. Lecture with the use of a multimedia presentation N2. Quizzes, surveys, group work ending with the presentation of the results

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement

F1	PEU_W01, PEU_W02 PEU_U01, PEU_U02 PEU_K01	Presentation on a selected micro- and macroeconomic issue
F2	PEU_W01, PEU_W02 PEU_U01, PEU_U02 PEU_K01	Conducting discussions and debates
P = 0,5*F1 + 0,5*F2		

PRIMARY AND SECONDARY LITERATURE
PRIMARY LITERATURE:
[1] "Principles of Macroeconomics" G. Mankiw, R.Kneenone, K.McKenzie, 2020, 8th edition, Publisher: Nelson Education
[2] "Microeconomics" G. Mankiw, M.Taylor, 2020, 5th edition, Publisher: Cengage
SECONDARY LITERATURE:
[3] "Basic economics: A common Sense Guide to the Economy" T. Sowell, 2007, 5th edition, Publisher: Basic Books
[4] "Economics" P. Krugman, R.Wells, 2018, 5th edition, Worth Publishers
SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)
Joanna.Kott@pwr.edu.pl

Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish: Etyka zarządzania i nowe technologie
Name of subject in English: Ethics of Management and New Technologies
Main field of study (if applicable): Business Engineering
Specialization (if applicable): Business Intelligence
Profile: academic
Level and form of studies: 2nd level, full-time
Kind of subject: optional
Subject code: W08IZZ-SM8037
Group of courses YES

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	**15**				**15**
Number of hours of total student workload (CNPS)	**50**				
Form of crediting	**crediting with grade**				
For group of courses mark (X) final course	**X**				
Number of ECTS points	**1**				
including number of ECTS points for practical classes (P)					
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)	**1,36**				

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

None

SUBJECT OBJECTIVES

C1 Developing and improving critical and independent thinking skills.
C2 Developing and improving the ability to clearly and unambiguously formulate and express thoughts.
C3 Acquainting with the basic ethical issues related to management and modern technologiesC2

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:
PEU_W01
Knows and understands the fundamental dilemmas of modern civilization
Relating to skills:
PEU_U01
Is able to apply the knowledge that they have learned to formulate and solve complex and non-routine problems as well as innovatively carry out tasks under unpredictable conditions by:

- properly selecting sources and information from them; conducting an assessment, critical analysis, synthesis and creative interpretation and presentation of this information,
- selecting and using proper methods and tools, including advanced techniques of information communications technology (ICT)

- adapting existing or developing new methods and tools

Relating to social competences:

PEU_K01

Is prepared to behave in a professional and ethical manner; perceives and formulates ethical dilemmas related to his own and someone's work; seeks appropriate solutions and the possibility of correvting irregularities in their attitudes and behavior in the workplace.

PROGRAMME CONTENT		
Lecture		**Number of hours**
Lec 1	Introduction	1
Lec 2	Foundations of ethics – selected issues	2
Lec 3	Outline of Engineering Ethics	2
Lec 4	Outline of Business Ethics	2
Lec 5	Introduction to Philosophical and Ethical Issues of New Technologies	2
Lec 6	Philosophical and Ethical Issues of Information Processing	2
Lec 7	Philosophy and Ethics of AI	2
Lec 8	Big Data and Ethics / Final Test	2
	Total hours	15

Seminar		**Number of hours**
Semin 1	Introduction – the specificity of the tools provided by the humanities	1
Semin 2	Foundations of ethics – selected issues: discussion	2
Semin 3	Outline of Engineering Ethics – selected examples	2
Semin 4	Outline of Business Ethics – selected examples	2
Semin 5	Introduction to Philosophical and Ethical Issues of New Technologies - discussion	2
Semin 6	Philosophical and Ethical Issues of Information Processing – selected examples	2
Semin 7	Philosophy and Ethics of AI – discussion	2
Semin 8	Big Data and Ethics – discussion of selected examples	2
	Total hours	15

TEACHING TOOLS USED
N1. Interactive lecture N2. Presentation N3. Discussion N4. Brainstorming

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
Lecture		
F1	PEU_W01	Test or in-class presentation
F2	PEU_U01, PEU_K01	In-class activity
Seminar		
F3	PEU_W01, PEU_U01 PEU_K01	In-class activity
P=(F1+F2+F3)/3		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Da Bomirda M., *The Big Data World: Benefits, Threats and Ethical Challenges*, Emerald Publishing Limited, 2021
[2] Mele D., *Management Ethics*, Palgrave Macmillan, 2012
[3] Spence E.H., *Stoic Philosophy and the Control Problem of AI Technology*, Rowman & Littlefield Publishers, 2021

SECONDARY LITERATURE:

[1] Alvanides S., Wiltshire D., *Ensuring the ethical use of big data: lessons from secure data access*, Heliyon 8, No 2., 2022
[2] Cappalen, H., Dever J., *Making AI Intelligible: Philosophical Foundations*, 2021
[3] MacIntyre A., *A Short History of Ethics*, 2022
[4] Shafer-Landau R., *Foundations of Ethics: An Anthology*, Oxford University Press, 2007
[5] Van de Poel I., *Three philosophical perspectives on the relation between technology and society, and how they affect the current debate about artificial intelligence*, Human Affairs 30, No 4., 499-511, 2020
[6] Wooldridge M., *The Road to Conscious Machines*, Pelican, 2020

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Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish Etyka nowych technologii
Name of subject in English Ethics of new technologies
Main field of study (if applicable): Business engineering
Specialization (if applicable): Business intelligence
Profile: academic
Level and form of studies: 2nd level, full-time
Kind of subject: optional
Subject code W08IZZ-SM8038
Group of courses YES

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	**15**				**15**
Number of hours of total student workload (CNPS)	**50**				
Form of crediting	**crediting with grade**				
For group of courses mark (X) final course	**X**				
Number of ECTS points	**1**				
including number of ECTS points for practical classes (P)					
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)	**1,36**				

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

No prerequisites required.

SUBJECT OBJECTIVES

C1 Student is aware of the importance of ethical rules related to technology development and competent to identify ethical dilemmas related to his own and someone else's work.
C2 Student is aware of non-technical aspects of engineering and of social responsibility of an engineer.

SUBJECT EDUCATIONAL EFFECTS

Relating to knowledge:

PEU_W01: Knows and understands the ethical norms and standards that determine the context of the economy and the organization, including the context of technology assessment and technology governance

Relating to skills:

PEU_U01: Is able to analyze texts from the field of technology ethics, including technology assessment and technology management, and formulate independent conclusions based on them

Relating to social competences:

PEU_K01: Is prepared to behave in a professional and ethical manner; perceives and formulates ethical dilemmas related to his own and someone else's work; seeks appropriate solutions and the possibility of correcting irregularities in their attitudes and behaviour in the workplace

PROGRAMME CONTENT		
Lecture		**Number of hours**
Lec 1	Introduction: morality, ethics, law. General ethics and applied ethics.	1
Lec 2	Ethical theories and types of justification of moral judgements.	2
Lec 3	Ethical dilemma: structure and types. Ethical dilemmas related to engineering and technology.	2
Lec 4	Expert and participatory technology assessment. Technology governance.	2
Lec 5	Risks and benefits of technology use. User experience: roboethics and other examples.	2
Lec 6	Ethical approaches tailored to new technologies. Ethical guidelines.	2
Lec 7	Ethical rules for professional engineering. Selected codes of ethics.	2
Lec 8	Obligations towards society: responsible research and innovation (RRI). Summary of the course.	2
	Total hours	15
Seminar		**Number of hours**
Semin 1	Introduction to the course. Distribution of course crediting tasks and explanation of the methods and approaches to be used in the analyses and micro-surveys.	1
Semin 2	Exercises in justification of moral judgements. Disagreement in knowledge and in attitudes.	2
Semin 3	Ethical dilemmas examples analysis. Identification of ethical dilemmas related to engineering activity and use of technology; group-work.	2
Semin 4	The process of formulation recommendations in technology assessment.	2
Semin 5	Risks and benefits of technology use: cases and examples. Exercises in user experience based on various scenarios.	2
Semin 6	Ethical rules and guidelines: analysis and exercises in possible implementation.	2
Semin 7	Developing a code of ethics: workshop.	2
Semin 8	Presentation of the course crediting case analyses and micro-surveys from the students. Summary of the course.	2
	Total hours	15

TEACHING TOOLS USED
N1. Interactive lecture with multimedial presentation. N2. Student groupwork.

N3. Student individual work.
N4. Case analysis.
N5. Brainstorming.
N6. Scenario methods.
N7. Thematic discussion.
N8. Workshop based of peer-learning approach.
N9. Peer-review and peer-feedback

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
F1	PEU_W01, PEU_K01 PEU_U01	Written work (case analysis or report from the micro-survey)
F2	PEU_W01, PEU_K01 PEU_U01	Participation in discussions, individual tasks, group activities, cooperation tasks;
F3	PEU_U01, PEU_K01	Presentation of case analysis and micro-survey results
P (lecture) =2/3*F1 +1/3*F2 P (seminar) = ½*F2+½*F3 P = 2/3*P(lecture) + 1/3*P(seminar)		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Budinger T.F., Budinger M. D., *Ethics of Emerging Technologies: Scientific Facts and Moral Challenges*, Hoboken, New Jersey 2006 (selected fragments).
[2] Furey H., Hill S., Bhatia S.K., *Beyond the Code. A Philosophical Guide to Engineering Ethics*, Routledge 2021 (selected fragments).
[3] Grunwald A., *Technology Assessment in Practice and Theory*, Routledge 2019 (selected fragments).

SECONDARY LITERATURE:

SELECTED FRAGMENTS:

[1] Doorn Neelke and others (eds.), *Early engagement and New Technologies: Opening Up the Laboratory,* Springer 2013.
[2] van den Hoven J., Doorn N., and others (eds.), *Responsible Innovations. Innovative Solutions for Global Issues,* Springer 2014.
[3] Kamm F.M., *The Trolley Problem Mysteries*, Oxford University Press 2016.
[4] Schermer M., *The Mind and the Machine. On the Conceptual and Moral Implications of Brain-Machine Interaction*, "Nanoethics" (2009) 3: 217-230.
[5] Swierstra T., Rip A., *Nano-Ethics as NEST-ethics: Patterns of Moral Argumentation About New and Emerging Science and Technologies*, "Nanoethics" (2007) 1: 3-20.
[6] Valero D., *Biomedical Ethics for Engineers*, Elsevier 2007.

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Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish: Etyka biznesu
Name of subject in English: Business ethics
Main field of study (if applicable): Business Engineering
Specialization (if applicable): Business intelligence
Profile: academic
Level and form of studies: 2nd level, full-time
Kind of subject: optional
Subject code: W08IZZ-SM8039
Group of courses: yes

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	**15**				**15**
Number of hours of total student workload (CNPS)	**50**				
Form of crediting	**crediting with grade**				**crediting with grade**
For group of courses mark (X) final course	**x**				
Number of ECTS points	**2**				
including number of ECTS points for practical classes (P)					
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)	**1,36**				

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

No prerequisites

SUBJECT OBJECTIVES

C1 Introduce students to the importance and role of ethics in modern business.
C2 To solve problems of social responsibility to the environment
C3 To show and analyze situations in which ethical problems may arise
C4 To sensitize students to ethical problems

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:
PEU_W01 – student has a basic knowledge about major theories of ethics
PEU_W02 – student reasons ethical issues and challenges typically encountered by the company in dealing with different stakeholder groups.
Relating to skills:
PEU_U01 – the student is able to identify and analyse ethical dilemmas typical of the company's relations with various stakeholder groups.
relating to social competences:
PEU_K01: – Is prepared to behave in professional and ethical manner; perceives and formulates ethical dilemmas related to his own and someone else's work; seeks appropriate solutions and the possibility of correcting irregularities in their attitudes and behaviour in the workplace.

PROGRAMME CONTENT		
Lecture		**Number of hours**
Lec 1	Organizational classes: discussion of the framework scope of the course, conditions for assessment and learning outcomes. Framing business ethics	1
Lec 2	Fundamentals of business ethics (norms and values, history)	2
Lec 3	Corporate Social Responsibility	2
Lec 4	Ecoethics	2
Lec 5	Ethics in selected business activities	4
Lec 6	Ethics in marketing and public relations	2
Lec 7	Summary and final test	2
	Total hours	15

Seminar		**Number of hours**
Semin 1	Organizational meeting	1
Semin 2	Modern concepts of ethics	2
Semin 3	Ethical standards of companies and employees	2
Semin 4	Injustice in the economy	2
Semin 5	Ethics of information	2
Semin 6	Human responsibility to the environment	2
Semin 7	Fair trade	2
Semin 8	Integrity in scientific research	2
	Total hours	15

TEACHING TOOLS USED
N1. Conversational lecture supported by audiovisual materials N2. Individual work of students N3. Group work N4. Case study N5. Presentation

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
F1 (lecture)	PEU_W01, PEU_W02	written assessment
F2	PEU_K01, PEU_U01	students' involvement during lecture
F3	PEU_U01, PEU_K01	presentation
P(lecture)=F1 P(seminar)= 0,8*F3+0,2*F2 P= 0,5*P(lecture) + 0,5* P(seminar)		

PRIMARY AND SECONDARY LITERATURE
PRIMARY LITERATURE: [1] Sandel M.J., *Justice*, Macmillan USA, 2010. [2] McIntyre A, *A Short History of Ethics*, United Kingdom, 1996. **SECONDARY LITERATURE:** [1] Chrissides G.D., Kaler J. H., An Introduction to Business Ethics, United Kingdom1993. [2] Chrysides G.D., Kaler J.H.: Essentials of business ethics, McGrawhill, 1996. [3] Crane, A., McWilliams, A., Matten, D., Moon, J., & Siegel, D. S. (Eds.). The Oxford handbook of corporate social responsibility, Oxford Handbooks, 2008.
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Zał. nr 5 do ZW 78/2023
Attachment no. 4. to the Program of Studies

FACULTY OF MANAGEMENT

SUBJECT CARD

Name of subject in Polish: BI day
Name of subject in English: BI day
Main field of study (if applicable): Business Engineering
Specialization (if applicable): Business Intelligence
Profile: academic
Level and form of studies: 2nd level, full-time
Kind of subject: obligatory
Subject code W08IZZ-SM8040
Group of courses NO

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)					**15**
Number of hours of total student workload (CNPS)					**25**
Form of crediting					**crediting with grade**
For group of courses mark (X) final course					
Number of ECTS points					**1**
including number of ECTS points for practical classes (P)					**1**
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)					**0,68**

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

none

SUBJECT OBJECTIVES

C1 Enabling students to share their previous experience and scientific interests
C2 Enabling students to get to know and establish cooperation with potential supervisors

SUBJECT LEARNING OUTCOMES

relating to skills:
PEU_U01 the student is able to look for useful sources of information (including English-language ones), methods and techniques and properly use them, integrate them, make their interpretation and critical evaluation, draw conclusions and formulate and exhaustively justify opinions
PEU_U02 the student can use information and communication techniques, applicable at various stages of the implementation of the diploma thesis;
PEU_U03 when preparing the presentation, he/ she is able to communicate in English using specialized terminology, using various techniques, also with the use of IT tools;
relating to social competences:
PEU_K01 the student has the ability to clearly formulate conclusions and present the results in a way that is understandable to a wide audience;
PEU_K02 the student is able to take an active part in the discussion

PROGRAMME CONTENT		
Seminar		**Number of hours**
Se1	Organizational meeting.	1
Se2-Se4	Presentations and discussions: First BI Day	7
Se5-S8	Presentations and discussions: Second BI Day	7
	Total hours	**15**

TEACHING TOOLS USED
N1. Presentation N2. Discussion N3. Workshop

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
F1	PEU_U01-03,	Preparing a presentation on the BI days' workshop
F2	PEU_U01-03, PEU_K01	Presenting the prepared presentation during the BI days' workshop
F3	PEU_KO2	Participation in discussions
P= F1*0,2+F2*0,5+F3*0,3		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Jonker, J., & Pennink, B. (2010). The essence of research methodology: A concise guide for master and PhD students in management science. Springer Science & Business Media.

[2] Taylor, B., Sinha, G., & Ghoshal, T. (2006). Research methodology: A guide to for reseachers in management and social sciences. PHI Learning Pvt. Ltd..

[3] Scandura, T. A., & Williams, E. A. (2000). Research methodology in management: Current practices, trends, and implications for future research. Academy of ManagementJjournal, 43(6), 1248-1264.

SECONDARY LITERATURE:

[1] 11 design tips for beautiful presentations by Katy French

[2] 8 tips for an awesome PowerPoint presentation by Damon Nofar

[3] PowerPoint alternatives (including Prezi for animated, "non-linear" presentations) by Andrew Kunesh

[4] Czakon, W. (Ed.). (2011). Podstawy metodologii badań w naukach o zarządzaniu. Wolters Kluwer Polska.

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