S t u d y p r o g r a m m e

Part A) of the study programme

L e a r n i n g o u t c o m e s

Faculty offering the field of study:	**Faculty of Economic Sciences and Management**
Field of study:	**Digital Economy**
Level of study:	**First-cycle studies**
Level of the Polish Qualification Framework:	**Level 6**
Degree profile:	**Academically oriented**
Professional degree awarded to the graduate:	**licencjat**
Allocation of the field of study within academic or artistic discipline(s), to which learning outcomes for a given field of study refer:	**Disciplines:** - **Economics and Finance (63%),** - **Management and Quality Studies (37%)** **Major discipline: Economics and Finance**

Symbol	**Upon completion the graduate achieves the learning outcomes specified below:**
	KNOWLEDGE (the graduate knows and understands)
K_W01	at an advanced level, mathematical and statistical methods and tools that allow to describe the structures and institutions related to digital economy, the processes taking place in them as well as relations between them;
K_W02	at an advanced level, general issues in the field of economics and finance on a micro-, macro- and global scales;
K_W03	at an advanced level, economic and financial structures and related institutions, as well as key effects resulting from activities of these institutions;
K_W04	at a basic level, ethical, economic, financial and legal standards and rules, including those relating to industrial property and copyright protection that specify the functioning of entities in digital economy;
K_W05	basic principles of creating and developing various forms of business capitalising on knowledge of economics and finance, especially related to the use of new solutions accompanying digital economy;
K_W06	issues related to the impact of digitisation on economy and its social and environmental effects;
K_W07	goals, essence, nature and interrelationships of management processes and implementation of changes in institutions as part of digitisation of economic processes;
K_W08	at an advanced level, concepts, methods and techniques for conducting research, including collecting and acquiring data from primary and secondary sources, data from social networks, selected tools of advanced data analysis and data visualisation that are necessary to conduct activities in digital economy;
K_W09	at an advanced level, the possibility of using the state-of-the-art information technologies as the basis for the development, provision and analysis of services or products carried out by business entities;
K_W10	at an advanced level, ICT tools and techniques used by business organisations in the digital economy era.
	SKILLS (the graduate is capable of)
K_U01	use knowledge and relevant sources to assess, interpret and solve complex or atypical problems related to the development of economy, in particular with its digitisation;
K_U02	conduct research on the processes taking place in digital economy and to evaluate their results, using advanced IT tools;

K_U03	use normative systems (legal, economic, social) in economic and financial decisions, taking into account changes generated by the digitisation of economy;
K_U04	apply research methods and techniques relevant to problems under conditions of economy's digitisation (including advanced IT tools and technologies as well as mathematical and statistical methods);
K_U05	understand and analyse the causes and course of phenomena in economy; is able to develop a theoretically insightful assessment of these phenomena in selected areas, including those related to the impact of digitisation;
K_U06	forecast economic processes and phenomena occurring in the era of digital economy with the use of methods and tools relevant to economic sciences as well as tools for finding patterns, models and correlations in large data sets;
K_U07	prepare typical written assignments and presentations, using state-of-the-art communication techniques, and to apply economic and financial terminology and terms related to the digitisation of economy;
K_U08	use a foreign language at the B2 level as specified in the requirements set by the Common European Framework of Reference for Languages, taking into account the terminology characteristic of digital economy;
K_U09	be communicative, use specialist terminology and take part in debates as well as effectively communicate the developments and achievements of economics and finance in the digital age in an understandable way; adjust the level and form of presentation to the needs and capabilities of the audience;
K_U10	formulate the directions of their development and to be focused on the continuous acquisition of new knowledge, skills and experience, in particular to keep up with the processes of digitisation of the economy and independently plan their own self-improvement and life-long improvement of professional competences;
K_U11	work in a team (also an interdisciplinary one), establish and maintain long-term and effective cooperation; to strive to achieve the goals of the team through appropriate planning and organisation of their own work and the work of other persons; to motivate colleagues to increase their efforts to achieve their goals;
K_U12	take decisions as to starting business activity, taking into account relevant selection of sources, their critical assessment of information, selection and use of relevant tools, including advanced ICT techniques and tools.
SOCIAL COMPETENCES (the graduate is willing to)	
K_K01	adhere to the rules of conduct specific to professions in the digital economy, including ethical professional standards, and requires the above from other persons;
K_K02	think and act as an entrepreneur in a changing economic reality;
K_K03	critically assess the knowledge and information received, taking into account changes generated by the economy's digitisation, and to consult experts in the event of difficulties in solving problems on their own;
K_K04	fulfil social commitments, co-organise activities for the benefit of the social environment and initiate activities for the public interest.

Description of the process resulting in the achievement of learning outcomes

Part B) of the study programme

Faculty offering the field of study:	Faculty of Economic Sciences and Management
Field of study:	Digital Economy
Level of study:	first cycle studies
Level of the Polish Qualifications Framework:	Level 6
Degree profile:	General academic
Allocation of the field of study within academic or artistic discipline(s), to which learning outcomes for a given field of study refer:	Disciplines: Economics and Finance (63%), discipline: Management and Quality Studies (37%) **Major discipline:** Economics and Finance
Mode of study:	full-time programme
Number of semesters:	six
Number of ECTS required for the award of qualifications corresponding to the level:	180
Total number of teaching hours:	1785 hours including university lectures
Professional degree awarded to the graduate:	licencjat
The relationship between the study programme and NCU mission and strategy:	UMK mission refers to educational activities corresponding to the current and future society needs as well as the development of cooperation and knowledge transfer with external partners Currently, one of the key challenges for enterprises is the implementation of digital transformation processes, the creation and introduction to the market innovations based on digital technologies, as well as the use of data for effective business operations Knowledge in this area is to be ensured by the proposed studies New studies will also enable establishing cooperation with other research centers and economic entities that will be directly involved in conducting classes and will enable to exchange thoughts and experiences between the scientific and economic communities

Courses/course modules along with expected learning outcomes

Module	Course	Expected learning outcomes (student:)	Forms and methods of teaching ensuring the achievement of learning outcomes	Methods of verifying and assessing expected learning outcomes achieved by the student
General education	Intellectual Property Protection	W1: has basic knowledge of intellectual property and is acquainted with methods of its protection, especially under industrial property and copyright laws (K_W04)	Informative (conventional) lecture	Written test

	Contemporary Learning Techniques	U1: is able to complete and improve knowledge in various subjects using the mindmapping technique and selected memorization techniques (K_U1)	Computer's presentations supported by elements of workshop exercises like mindmapping, memorization techniques and educational kinesiology	Written assessment in classroom
	Business English	U1: understands oral and written communications in English on topics related to the digital economy K_U07) U2: is able to communicate in English using a variety of channels and techniques on general and digital economy-related topics K_U08) U3: is able to read and listen with understanding, translate, analyze and interpret various types of texts, and verbal communications in English and find in them the information needed to function in the digital economy K_U07) U4: has the ability to prepare typical written work and oral presentations on issues relevant to the digital economy K_U08)	Cognitive-communicative method with the use of various media and varied forms of student work	Written egxam, continuous assessment (current preparation for classes, completion of homework and activity in classes), tests
	Physical Training	depends on the chosen course	depends on the chosen course	depends on the chosen course
	Huminities lectures	depends on the chosen lecture	depends on the chosen lecture	depends on the chosen lecture
	University lectures	depends on the chosen lecture	depends on the chosen lecture	depends on the chosen lecture
	Occupational Safety, Health and Ergonomics	Moodle course		
	Information Technology I	W1: knows the tools available in the MS Office package (K_W08, K_W10) W2: knows the basic services of the Internet (K_W09, K_W10) U1: is able to choose the appropriate MS Office tools to solve problems in business (K_U02, K_U04, K_U06) U2: is able to use Internet services and use tools for individual and	Show, practical, discussion, classic problem-solving	Written test, observation of the student activity, solving problems alone and in groups

		remote work (K_U01, K_U04, K_U06) K1: is able to analyze and solve problems using IT tools and act in an entrepreneurial way in the changing economic realities (K_K02, K_K04)		
	Information Technology II	W1: has advanced knowledge of MS Office tools (K_W01, K_W08, K_W10) W2: knows the basic protocols of the Internet (K_W09, K_W10) U1: is able to use advanced MS Office tools to analyze the processes occurring in the digital economy (K_U02, K_U04) U2: is able to use terminology specific to the digital economy (K_U07) K1: is ready to analyze problems, implement IT solutions and act in changing economic realities (K_K02)	Show, practical, discussion, classic problem-solving	Written test, observation of the student activity, solving problems alone and in groups
Unit Basic Subjects	Applied mathematics	W1: knows and understands mathematical methods that allow for quantitative analysis of economic phenomena (K_W01) U1: is able to apply acquired theoretical knowledge to formulate and solve selected mathematical problems, and also related economic problems (K_U02, K_U04) U2: is able to apply computer software to solve specific mathematical problems (K_U02, K_U04) K1: is prepared and willing to formulate the problem, and to solve it using the proper solution method (K_K03)	Informative (conventional) lecture, practical	Written examination, test, individual work/activity

	Statistics in economic studies	W1: chooses appropriate statistical methods depending on the type of statistical data and studied phenomenon (K_W01) W2: uses statistical notions correctly (K_W01) U1: calculates descriptive measures (K_U01) U2: applies correlation measures (K_U01) U3: estimates parameters of regression model and calculates measures of goodness of fit, performs statistical inference and evaluation of the regression model quality (K_U01) U4: applies statistical tests of different parameters in the population (K_U01) U5: calculates dynamic indecies (K_U01) U6: interprets the results from both statistical and economic point of view (K_U01)	Informative lecture with the use of computer presentations, exercise	Written examintation, written assessment in classroom, quiz
	Econometrics and Forecasting	W1: knows the principles and methods of building econometric models (K_W01) W2: knows specialized software/computer packages (eg Gretl) for modeling economic processes (K_W01) W3: knows the basic forecasting methods and forecasting schemes based on time series models and descriptive/causal models (K_W01) U1: is able to construct and evaluate the quality of an econometric model (K_U04) U2: is able to analyze the causes and course of economic phenomena using econometric models (K_U05) U3: is able to forecast economic processes and phenomena using econometric models and evaluate the	Informative lecture with the use of computer presentations, problem-based lecture), exercise	written exam, test, quiz, project

		quality of the obtained forecasts (K_U06)		
	Introduction to economics in the digital economy	W1: knows and understands at an advanced level issues in the area of microeconomics and macroeconomics (K_W02) W2: knows and understands at an advanced level the basic economic structures and relationships between them (K_W03) U1: can use relevant sources and theoretical knowledge in the field of microeconomics and macroeconomics to analyze, interpret and evaluate economic phenomena and problems including in particular challenges related to sustainable development and digital transformation (K_U01, K_U05) U2: is able to analyze economic decisions in terms of compliance with legal, economic and social standards (K_U03) K1: is ready to assess his knowledge gained as a result of the course in the field of basic economics and to consult experts in the event of difficulties with solving the problem on his own (K_K03)	Informative lecture (conventional), problem-based lecture, discussion, solving tasks, case study	Written examination, colloquium, presentations, observation of the student activity

	Business Law	W1: has a basic knowledge of legal rules connected with starting, conducting and ending of business activity (K_W04) W2: is familiar with the forms of business activity (K_W05) U1: is able interpret the basic norms of business law in the professional relations (K_U03) U2: is capable to solve the common problems in business activity using the rules of business law (K_U12) K1: understands the significance of acting according to legal norms in business and private relations (K_K01) K2: understands the significance of updating the knowledge of legal norms in business law, including the changes of law connected with digitalization (K_K03)	Informative lecture, case studies presentation	Written examination
	Management in digital economy	W1: knows and understands the classic and modern methods of analyzing the organization and its environment, relations between the functional areas of the enterprise and the types of organizational structures and factors influencing their changes In addition, they demonstrate the knowledge of instruments and tools that allow for solving problems in the area of management of organizations as part of the ongoing digitization (K_W07) U1: has the following skills: proper diagnostic assessment of the organization, analytical and interpretation related to the basic phenomena and processes of digitization taking place in modern enterprises with the use of basic concepts and theoretical approaches (K_U05) K1: is ready to think and act in an	Conventional lecture, problems lecture	Written exam

		entrepreneurial way, as well as to recognize the role of knowledge in the discipline of management and quality science in solving management problems accompanying organizations in the changing economic realities (K_K02)		
	Marketing and Marketing Research	W1: knows the role of marketing and marketing research in carrying out activities within the digital economy (K_W08) W2: knows and understands the differences between primary and secondary sources of information(K_W08) W3: knows the basic methods of collecting data from primary and secondary sources K_W08) W4: knows the random and non-random sampling techniques (K_W08) W5: knows the rules of designing an interview questionnaire and the survey questionnaire (K_W08) W6: knows the activities undertaken at the stage of research design, data collection, data reduction, data analysis, as well as the presentation and evaluation of the results of the marketing research (K_W08) U1: is capable of planning activities and marketing instruments necessary to solve problems related to the development of the digital economy (K_U01) U2: is capable of identifying the main types of information sources used in marketing research K_U04) U3: is capable of transforming	Conventional lecture and problem-based lecture, discussion, case study	written examination, final test, different types of exercises or tests during tutorials or at home (individual or teamwork)

		decision problems into research problems (K_U04) U4: is capable of determining the size of the random and non-random sample for the marketing research (K_U04) U5: is capable of designing questionnaire questions and properly scaling the answers (K_U04 K1: is ready to resolve ethical dilemmas related to the implementation of marketing research (K_K01)		
Unit Main Course Subjects	Basics of banking and financial markets	W1: knows and understands at an advanced level the economic and financial structures and their institutions as well as the key effects of the activities of these institutions in the sphere of banking and financial markets (K_W03) W2: knows and understands at an advanced level the economic and financial norms and rules that define the functioning of entities in the banking sector and financial markets (K_W04) U1: is able to use normative systems (legal, economic, social) in the area of economic and financial decisions in the sphere of banking and financial markets, taking into account the changes generated by the digitization of the economy (K_U03)	Information lecture, problem lecture, presentation with description, discussion, multimedia presentation	Written exam
	Corporate finance	W1: knows and understands to an advanced degree the principles of corporate financial management, with particular emphasis on the methods of shaping the structure of assets and capitals for financing the activities of the enterprise (K_W03) W2: knows and understands to an advanced degree the economic and financial norms and rules that determine the functioning of	Informative lecture, problem lecture, demonstration with description, discussion, multimedia presentation, solving tasks, case study	Written exam, two colloquia, observation of the student activity

		enterprises in the digital economy (K_W04) U1: is able to use economic and financial principles in the area of economic and financial decisions, made in the enterprise (K_U03)		
	Introduction to artificial intelligence	W1: has an advanced understanding of the structure and functioning of artificial intelligence systems used by business organizations in the digital economy (K_W06) W2: is familiar with fundamental AI concepts (K_W01) W3: understand the capabilities and limitations of generative AI technology, large language models (LLM), large multimodal models (LMM), small language models (SLM), and image and sound generation technologies (K_W06) W4: comprehend the fundamentals of AI systems (K_W07) U1: is able to independently use artificial intelligence systems to solve business problems (K_U01) U2: can critically assess the usefulness of various new systems for their needs (K_U01) U3: is capable of searching for and interpreting information about AI from reliable sources (K_U02) U4: can understand the implications of lectures they have attended and formulate relevant questions (K_U01) U5: can identify appropriate AI tools for business problems (K_U02) K1: appreciate the need for continuous learning and critical evaluation of information in a rapidly evolving field (K_K03)	Informative lecture, case study	Final project

	Start in business and a business plan Business start-up and business plan	W1: knows the basic principles of creating and developing various forms of entrepreneurship using knowledge in the field of economics and finance, especially related to the use of new solutions accompanying the digitization of the economy (K_W05) U1: is able to use economic and financial principles in the area of economic and financial decisions made in the enterprise (K_U03) K1: is ready to think and act in an entrepreneurial way in the changing economic realities (K_K02)	Information lecture, problem lecture, presentation with description, discussion, multimedia presentation, case study	Written exam, case studies
	Digital technologies in economy and finance	W1: knows the possibilities of using the latest information technologies as the basis for the creation, offering and analysis of services or products by business entities and can assess the consequences of their use (K_W09) W2: has knowledge of the characteristics of information and communication (ICT) instruments, tools and techniques used by business organizations in the digital economy (K_W10) U1: is able to use knowledge and select appropriate sources for the assessment of the possibility of using digital technologies to solve problems related to the development of organizations within the digital economy (K_U01)	Information lecture, problem lecture, presentation with description, discussion, multimedia presentation	Written exam, observation
	Cybersecurity	W1: has knowledge of basic concepts in the field of internal security as a sub-area of social sciences and knowledge of cyber security (K_W06) U1: can observe and interpret social phenomena in cyberspace He notices their interrelationships Understands the causes and course of phenomena	Description, discussion, problem-based lecture, classic problem-solving	Written exam, test

		related to cyberspace security Is able to use theoretical knowledge about threats related to cyberspace (K_U01) K1: is ready to specify the basic priorities aimed at counteracting threats in cyberspace to the existing social structures. Using modern techniques, he communicates skillfully and without problems with the environment, providing knowledge about the existing threats and the possibilities of protection against them (K_K04)		
	Business data visualisation	W1: knows the methods and techniques of business data visualization (K_W08) W2: knows and can use Business Intelligence systems for data analysis and visualization (K_W10) U1: can evaluate and draw conclusions based on the prepared analyzes (K_U02) U2: has the ability to find patterns and dependencies contained in data (K_U12) K1: is ready to present the results of the analyzes carried out reliably and in accordance with the facts (K_K01)	Exercises, talk, group work, using the Business Intelligence Qlik Sense tool, solving tasks	Oral exam , project, presentation, continuous assessment (activity in classes, completion of homework)
	Management Information Systems	W1: identifies the classes of information systems supporting the management of the organizations (K_W09) W2: lists the functionalities of IT systems in the organization (K_W10) U1: effectively manages the known functional modules of IT systems in the organization (K_U11) U2: distinguishes and understands the connections of business processes in a typical organization and identifies their mapping on the IT platform (K_U01, K_U11) K1: is ready to think and act in an	Informative lecture (conventional), exercise	Written examination, test, observation of the student activity

		entrepreneurial way in the changing economic realities on the basis of the assessment of related risks and to take up challenges allowing to use the acquired knowledge in the field of using information-based management systems (K_K02)		
	E-government	W1: knows the essence and development trends of e-government (K_W02) W2: knows the tasks and services of e-government (K_W03)	Traditional lecture using PowerPoint	Written exam
	Digital economy business models	W1: knows and understands theoretical and practical assumptions of business model design (K_W10) W2: knows and understands roles of the business model in the digital economy K_W07) W3: knows and understands selected case studies of modern business models of enterprises and organizations based on values K_W06) U1: has the ability to defining the basic elements of building business models (K_U01) U2: has the ability to design business models and the principles of building an innovative business model K_U01) The student has competences in the following areas: K1: analytical thinking and creative search for solutions to organizational problems arising in the preparation of a business model (K_K02) K2: use of various sources of information (K_K03) K3: takes into account the social and environmental conditions of business activity (K_K01)	Conversation lecture, show, case study	written test, activity, carrying out tasks, team work, case studies - prolonged observation by the tutor, independent work (final project prepared in teams and its presentation)

	Project Management	W1: describes the possibilities of using information and communication technologies in project management (K_W10) U1: takes an active part in planning and organizing team projects in order to complete the task set for him on time and in accordance with the established quality requirements (K_U11) K1: solves the task set for him in a creative way, critically analyzing and completely modeling the problem under consideration (using appropriate tools and techniques, taking into account the knowledge and opinions of experts), collecting the necessary data for this purpose, specifying key issues/factors/criteria that should be taken into account and identifying relationships between them (K_K03) K2: uses quantitative methods and appropriate software in the project management process, interprets the obtained results and uses them to make the best decisions for the benefit of stakeholders (K_K04)	Informative lecture, description, talk, discussion; presentations in the Microsoft Office PowerPoint; using the Excel spreadsheet, GanttProject and OpenProject/Microsoft Project programs; solving tasks; project	Written exam, team project, teamwork on solving a decision-making problem related to project management, continuous assessment (preparation for classes, homework and activity in the classroom)
	Industry 4.0	W1: knows and understands selected problems of modern digital technologies and their impact on the economy and society (K_W02) W2: knows and understands the effects of changes that modern digital technologies introduce into the principles of enterprise functioning and social behavior (K_W02) U1: has the ability to indicating the importance of the selected technology for the economy and society (K_U01) U2: has the ability to analyzing case studies of changes taking place in the economy under the influence of	Traditional lecture with the use of presentations, conversation lecture, case study	Written exam, observation of the student activity, solving task

		industry 4.0 (K_U01) The student has competences in the following areas: K1: use of various sources of information (K_K03) K2: effective communication (K_K04)		
	Digital transformation of the economy and sustainable development	W1: knows the social and environmental aspects of the digital transformation of the economy (K_W06 U1: is able to assess the effects of using digital technologies in the context of sustainable development of the economy (K_U05)	Informative lecture (conventional), conversational lecture, problem lecture	Written exam
	Ethics in business and technology	W1: knows and understands to an advanced degree the norms and ethical rules, including those concerning respect and protection of industrial property and copyright, defining the standard of socially responsible, environmentally sustainable and transparent functioning of digital economy entities (K_W04) W2: knows and explains the impact of digitisation on the economy and its social and environmental effects (K_W06) U1: is able to create and use an ethical normative system when making responsible economic, financial, environmental and personal decisions, taking into account the changes generated by the digitalization of the economy (K_U03) U2: strives for personal self-development in the aspect of key	Conventional lecture with elements of a conversation class, problem-based lecture, case studies, multimedia presentation, comparative study method	Credit test, group discussion during classes, analysis of selected case studies, activity, observations and field and media reports

		ethical competences and is oriented in this respect to the continuous acquisition of new knowledge, skills and experience in order to react adequately to innovations in the area of digitisation of the economy and to plan his/her own self-improvement and improvement of professional competences throughout life (K_U10) U3: is able to work competently, creatively and synergistically in a team, guided by the ethical and business directive of harmonious cooperation avoiding segregationist, violent, harassing and discriminating behaviours, strives for the achievement of the team objectives through appropriate planning and organisation of his/her own work and that of others, motivates his/her co-workers to increase their efforts to achieve the assumed objectives of the company (K_U11) K1: abides by the rules of conduct adopted in professions related to the digital economy, including ethical professional norms, and requires others to do so, aiming to enhance the organisational culture of the enterprise in which he/she is employed, and to strengthen the social prestige and ethos of the professional group he/she represents (K_K01) K2: fulfils the social obligations to which the digital economy is subject, and initiates, co-organises or supports the activities of his/her own professional environment for the benefit of the social environment (K_K04) K3: initiates, coordinates or supports activities taking into account the		

		public interest, inter alia by evading or signalling to competent authorities for ethical reasons identified violations, abuses or crimes against the public interest (K_K04)		
	Communication in business I	W1: knows to an advanced degree the instruments and techniques of communication used in enterprises in the age of the digital economy (K_W10) U1: is able to be communicative, use specialized terminology and participate in debate and effectively convey information in the business world, and is able to adapt the way of communication to the needs of the audience (K_U09) U2: is able to prepare typical written works in English and speeches, using modern techniques of communication (K_U07) U3: is able to work in teams, taking care of cooperation between its members, especially through effective communication (K_U11) K1: is ready to critically evaluate the knowledge he possesses and the content he receives especially on the level of communication in enterprises (K_K03)	Multimedia lecture, conversational lecture, workshop, group work, simulation, case study	Written exam, activity during classes, final work
Specialisation Data Science in Business	Introduction to scripting languages - Python and R	W1: has knowledge about programming, knows: principles of structured programming, programming constructs, data types (K_W08) U1: is able to write correct programming code (K_U04) U2: is able to process data, in particular to transform them for mathematical and statistical analysis (K_U04) K1: is able to analyze problems and implement optimal programming	Show, practical, discussion, classic problem-solving	Activity in class and solving simple programming tasks, practical test at the computer

		solutions taking into account the changes generated by the economy (K_K02, K_K03) K2: is ready to seek expert opinions and expand own competences (K_K03)		
	Managing data and data systems in the organization	W1: has knowledge of relational database models (K_W08, K_W09, K_W10) W2: has knowledge of tools that support work in relational databases (K_W08, K_W09, K_W10) U1: is able to design a database according to certain rules (K_U04) U2: is able to search information in the database (K_U04) U3: is able to work with data in the database (K_U04) U4: can programing their own functions, procedures, triggers (K_U04) K1: is able to analyze problems and implement an IT solution while respecting professional ethical standards (K_K01) K2: is ready to seek expert opinions, expand own competences and fulfill social obligations (K_K03, K_K04)	Show, practical, discussion, classic problem-solving	Project and implementation of own database application, test, solving given problems
	Software for Business Analysis	W1: can acquire, process and analyze data collected by entities conducting business activity (K_W08) W2: knows and uses software designed to prepare business analyzes (K_W10) U1: can make economic decisions based on previously prepared analyzes (K_U11) U2: has the ability to find patterns and relationships in large economic data sets (K_U12) K1: is ready to act and take up challenges in the economic	Exercises, talk, group work, use of a business analysis tool, eg KNIME, problem solving	Oral exam, project, presentation, continuous assessment (current preparation for classes, activity in classes)

		environment, based on the acquired knowledge (K_K02)		
	Big Data processing	W1: knows and understands to an advanced degree the methods and computer tools that allow to describe the structures of Big Data sets, the processes occurring in them, as well as the relationships between them (K_W01) W2: knows and understands to an advanced degree the concepts, methods and techniques for collecting and retrieving Big Data sets from primary and secondary sources, data from social networks, selected tools for visualization of Big data sets, necessary for conducting activities in the digital economy (K_W08) W3: knows and understands to an advanced degree the instruments and tools for processing Big Data sets that are used by organizations and institutions in the era of digital economy (K_W10) U1: is able to use knowledge and relevant sources to diagnose, interpret and solve complex problems of collection and processing of Big data sets that serve the digitization of business and economy (K_U01) U2: is able to apply methods and techniques of research of Big data sets that are appropriate to the problems in the conditions of digitization of business and economy (K_U04) K1: is prepared and willing to respect ethical standards and principles of conduct in the collection and	Conventional lecture, exercise, laboratory	Written examination, test, independent solution of a problem related to Big data processing (computer laboratory)

		processing of Big data sets and requires others to do so (K_K01)		
	Introduction to Data Science and Machine Learning	W1: knows and understands at an advanced level the concepts, methods and techniques of research, including the collection and acquisition of data from primary and secondary sources, data from social networks, selected tools of advanced data analysis and data visualization necessary to conduct activities within the digital economy (K_W08) W2: knows at an advanced level the methods and mathematical and statistical tools that are the foundation of data science (K_W10) U1: is able to use research methods and techniques appropriate to the problems in the digitalisation of the economy (K_U04) U2: is able to forecast economic processes and phenomena occurring in the era of digital economy with the use of methods and tools appropriate for economic sciences, as well as tools for finding patterns and correlations in large data sets (K_U12) K1: is ready to think and act in an entrepreneurial way in the changing economic realities on the basis of the	Informative lecture (conventional), exercise	Written examination, test, in-class activity

		assessment of related risks and to take up challenges allowing to use the acquired knowledge in the field of data science - (K_K02)		
	Unsupervised learning in economic applications	W1: knows and understands at an advanced level, unsupervised learning methods for association and taxonomic studies (K_W01, K_W08, K_W09, K_W10) W2: knows and understands at an advanced level, methods and techniques for collecting and preparing data for association analysis and taxonomic research (K_W08) W3 knows the possibilities and limitations of using unsupervised learning methods in comparative analyses, especially in the dynamic approach (K_W01 U1: is able to conduct research on unsupervised learning using proper methods for data exploration (K_U02, K_U04, K_U11, K_U12) U2: interprets the results of analyses, assesses the nature and significance of observed regularities, relationships and changes over time (K_U01) U3: interprets data and is able to use various data sources (K_U01) U4: orders and groups economic objects in a cross-sectional approach, including spatial and temporal	Informative (conventional) lecture, practical	Written examination, project, individual or group work

		(K_U01, K_U04) U5: is able to apply proper computer software to explore and analyze unsupervised learning rules (K_U04, K_U11) K1: is prepared and willing to formulate the problem in the field of unsupervised learning, and to solve it using the proper solution method, adhering ethical professional standards (K_K01, K_K03) K2: understands the usefulness and importance of analyses using selected unsupervised learning methods Understands the need to expand knowledge and improve skills in the analysis of complex economic phenomena, necessary for entrepreneurial action (K_K02)		
	Predictive analytics	W1: knows and understands at an advanced level, supervised learning methods for predictive analytics (K_W01, K_W08) W2: knows and understands at an advanced level, methods and techniques for collecting and preparing data for predictive analytics (K_W08) U1: is able to conduct research using proper methods for predictive analytics (K_U02, K_U04, K_U11, K_U12) U2: is able to apply proper computer software to conduct studies in the field of predictive analytics (K_U04, K_U11) K1: is prepared and willing to formulate the problem in the field of predictive analytics, and to solve it using the proper solution method, adhering ethical professional standards (K_K01, K_K03)	Informative (conventional) lecture, practical	Written examination, project, individual or group work

	Time series analysis	W1: at an advanced level, mathematical and statistical methods and tools of time series analysis that allow to describe the structures and institutions related to digital economy, the processes taking place in them as well as relations between them (K_W01) W2: at an advanced level, concepts, methods and techniques for conducting research of time series analysis, including collecting and acquiring data from primary and secondary sources, data from social networks, selected tools of advanced data analysis and data visualisation of time series analysis that are necessary to conduct activities in digital economy (K_W08) U1: understands and analyse the causes and course of economic processes in economy, is able to theoretically insightful assessment of these phenomena in selected areas, including those related to the impact of digitization (K_U05) U2: anticipate economic processes and phenomena occurring in the era of digital economy with the use of methods and tools relevant to time series analysis as well as tools for finding patterns, models and correlations in large data sets (K_U06) K1: is prepared and willing to formulate the problem in the field of time series analysis, and to solve it using the proper solution method, adhering ethical professional standards (K_K01, K_K03)	Multimedia presentation, case study, computer laboratory	Written exam (theoretical and practical), final test, activity

	Non-Classical Forecasting Methods	W1: knows and understands mathematical and statistical methods and tools necessary to determine forecasts of economic phenomena (K_W01) W2: knows and understands specialised software (eg R, Gretl) for modelling and forecasting economic processes (K_W08) U1: is able to can obtain and use a variety of data sources related to the development of the economy (K_U01) U2: is able to forecast economic processes and phenomena (K_U06) K1: is prepared and willing to perform assigned tasks conscientiously and accurately Proceed ethically (K_K01) K2: is prepared and willing to work independently and effectively with large amounts of data To carry out analysis and draw conclusions using the principles of logic (K_K02)	Informative lecture, working with GRETL, R-CRAN and Excel software Teaching using real macroeconomic and enterprise data	Written examination, test and solving chosen problems, project and observation
	Text analytics of data from social media	W1: at advanced level knows the techniques of text data analysis of social media, their representation and visualization (K_W08) U1: evaluate results of text analysis in the context of the processes taking place in digital economy (K_U02) , U2: is able to develop a text data analysis system in Python (K_U04) K1: understands the interdisycplinary nature of big social data analysis (K_K03)	Description, practical, project work	Written examination, project
	Network analysis and recommender systems	W1: knows and understands at an advanced level, methods and techniques for collecting and preparing data, for network studies and building recommender systems (K_W08) W2: knows and understands at an advanced level, possibilities of	Informative (conventional) lecture, practical, case study	Written examination, project, individual or group work

		efficient application of recommender systems for the development, provision and analysis of services or products carried out by business entities (K_W08, K_W09) W3: knows and understands at an advanced level, methodology of graph and network theory (K_W10) U1: is able to apply methodology of graph and network theory to analyze communities in real networks (K_U04, K_U12) U2: is able to build and analyze recommender systems (K_U04, K_U12) K1: is prepared and willing to formulate the problem in the field of predictive analytics, and to solve it using the proper solution method, adhering ethical professional standards (K_K01, K_K03)		
	RPA and chatbots	W1: knows at an advanced level the possibility of using the latest UiPath platforms as the basis for creating services or products in the field of digitisation, automation and robotisation of the processes of business entities (K_W09) U1: can practically use knowledge and appropriate tools to solve problems of business entities in the environment of digitisation, automation and robotisation of internal processes (K_U01) K1: is ready to think creatively and act in order to solve problems of business entities in the environment of digitisation, automation and robotisation of internal processes (K_K02)	Problem solving, project, discussion, group work, observation, case study	Project, observation of the student activity

	Data Driven Decisions	W1: knows quantitative methods for optimizing business decision-making processes and improving the quality of management decisions based on digital data (K_W10) U1: is able to independently classify and thus qualify decision-making situations and associate new decision-making situations with the learned model structures (K_U01) U2: is able to use the known tools to determine decisions based on digital data (K_U01, K_U04) K1: is ready to think and act in an entrepreneurial way in the changing economic realities on the basis of the assessment of related risks and to take up challenges allowing to use the acquired knowledge in the field of decision-making methodology based on digital data (K_K02)	Exercise	Project, In-class activity
	Management and implementation of Data Science projects	W1: lists the basic IT structures and tools used in the implementation of data science projects (K_W01) W2: formulates decision problems related to data science project management and chooses a decision-making method appropriate from the point of view of the decision problem under consideration (K_W07) W3: is able to list the key stages of a data science project, knows the structure of the division of work within the project, and also carries out a risk analysis for the project (K_W07) W4: determines the purpose and issues of project management and recreates the model of project implementation over time (K_W08) W5: has a structured knowledge of the selected data science methods (K_W10) U1: uses quantitative methods in the	Informative lecture (conventional), problem lecture, laboratory, exercises, description, talk, multimedia projects	Assessment are based on mini-projects, partly performed in laboratories and partly independently.

		project management process, interprets the obtained results and uses them to make the best decisions (K_U01) U2: Can reformulate the processing problem in such a way that its solution uses the methods available among those presented (K_U12) K1: Can precisely formulate questions to deepen his own understanding of a given topic or to find missing elements of understanding (K_K02) K2: Can independently search for information in literature, also in foreign languages (K_K03) K3: Works systematically and has the ability to positively approach difficulties standing in the way of achieving the assumed goal, keeps the deadlines (K_K04)		
	Multi-criteria mangerial decision aiding	W1: indicates the possibilities of using information and communication technologies in making managerial decisions (K_W10) U1: takes an active part in the planning, organization and effective implementation of team projects in order to complete the task set for him on time and in accordance with the established quality requirements (K_U11) U2: uses multi-criteria methods and appropriate software in the process of making managerial decisions, including decisions regarding the initiation of economic activity (K_U12) K1: carries out the tasks set for him in a creative and entrepreneurial way (K_K02) K2: critically analyzes and completely models the problem	Description, talk, discussion; presentations in the Microsoft Office PowerPoint; solving tasks; project	Teamwork on solving managerial decision-making problems, continuous assessment (preparation for classes, homework and activity in the classroom)

		under consideration (using appropriate tools and techniques, taking into account the knowledge and opinions of experts), collecting the necessary data for this purpose, specifying key issues/factors/criteria that should be taken into account and identifying relationships between them (K_K03)		
	Statistical methods of survey data	W1: knows statistical tools that allow to analyze the structure of the collected data (K_W01) W2: knows the methods and techniques of collecting data in opinion polls (K_W08) W3: knows selected tools of advanced data analysis and data visualization (K_W08) U1: interprets data and information collected from questionnaires (K_U01) U2: can use knowledge in practice to build a questionnaire and design a survey (K_U01) U3: can use appropriate data collection methods (K_U04) U4: can find correlations between the variables included in the questionnaire (K_U06) K1: is ready to obey ethical and legal standards related to the protection of personal data in questionnaire surveys (K_K01)	Lecture with elements of a multimedia presentation, exercise, discussions	Written exam, evaluation of the student's activity during classes in the laboratory, presentations of self-performed tasks, final control project

	Methods and models for spatial data analyses	W1: knows methods and tools in the field of spatial statistics and spatial and spatio-temporal econometrics, useful for the study of economic phenomena and processes (K_W01) W2: knows rules for conducting research with the use of spatial data (K_W01) W3: knows methods and techniques of obtaining data necessary to conduct research on economic phenomena (K_W01) U1: can use methods and tools of spatial statistics as well as spatial and spatio-temporal econometrics for studying economic phenomena in terms of digitization of the economy (K_U01, K_U04) U2: identifies the structures of regional data (spatial and spatio-temporal) and interprets data, is able using various data sources (K_U01) U3: can diagnose and forecast spatial phenomena related to the digitization of the economy (K_U01) U4: uses appropriate statistical and econometric analysis software (K_U04) K1: understands the usefulness and importance of analyzes using tools and methods in the field of modern spatial statistics and econometrics, understands the need to expand knowledge and improve skills in the field of analysis of complex economic phenomena, necessary for entrepreneurial activity (K_K02) K2: is ethical in acquiring and using knowledge (K_K01)	Informative/conventional lecture, practical, project work, presentation of a paper/report	test, exercise classes end preparation of the final course work

	Financial Econometrics	W1: knows modern methods and tools for analyzing and forecasting financial time series (K_W01) U1: evaluates the relationship of financial processes and markets based on financial econometric models (K_U05, K_U12) K1: works independently and effectively with large amounts of data, sees dependencies and correctly draws conclusions using the rules of logic, can precisely formulate questions to deepen his own understanding of a given topic or to find missing elements of reasoning (K_K02)	informative lecture (conventional), problem lecture, exercise	Written examination, test, project, observation of the student activity
	Diploma seminar	W1: has subject matter knowledge of issues related to the digitisation of economic and financial processes (K_W02, K_W06, K_W07) W2: has advanced knowledge of methods and tools, including data acquisition techniques, used to describe structures and institutions within the digital economy (K_W01, K_W08) U1: has the ability to carry out logically coherent economic analyses of selected problems in the digital economy (K_U01, K_U02, K_U04, K_U05, K_U06) U2: has the ability to prepare typical written work in Polish in accordance with the requirements for a good thesis (K_U07) K1: enhances his/her ability to participate competently in discussions on relevant issues in the digitisation of the economy (K_K02, K_K03)	seminar method	Observation of progress in the preparation of the thesis

Specialisation Digital innovations in business &FinTech	Digital transformation of enterprises and transformation plan	W1: The student knows and understands the essence of the digital transformation of economy and business (K_W05) W2: The student knows and understands the effects of digitization processes for economic activity (K_W06) W2: The student knows and understands principles of digital maturity analysis and preparation of a digital transformation plan (K_W05) W4: The student knows and understands methods of conducting transformation, design thinking (K_W07) U1: The student is able to distinguish between models of creating a digital transformation plan (K_U01) U2: The student is able to prepare a digital transformation plan in a selected area of operation of the organization (K_U06) U3: The student is able to present the results and conclusions of the analysis publicly and work effectively in a team (K_U09) K1: The student has social competences in the field of analytical thinking and creative search for solutions to complex organizational problems (K_K02) K2: The student can use the acquired knowledge to solve practical problems related to the economic development of enterprises and their impact on society (K_K04) K3: The student can assess the risks associated with evaluating the role of individuals implementing digital transformation. K_K02	Traditional lecture using PowerPoint presentations, exercise, case studies, activity, carrying out tasks	Test, continuous assessment (preparation for classes, homework and activity in the classroom)

	Entrepreneurship and development of startups	W1: knows and understands the basic principles and management tools in the process of creation and development of forms of individual entrepreneurship, including those related to the application of solutions accompanying the digitisation of economy (K_W05) U1: is able to make decisions concerning the initiation of economic activity, taking into account a proper selection of information sources, their critical evaluation, analysis and synthesis, selection and application of proper tools (K_U12) K1: is ready to think and act in an entrepreneurial manner in a changing economic reality, which enables him/her to solve problems occurring at the stage of construction and implementation of the concept of activity of forms of individual entrepreneurship (K_K02)	Informative lecture (conventional), conversational lecture, problem-based lecture, exercising, classic problem method, case study	Writing test, preparation of a concept for a new business
	Innovative projects and fundraising for R&D	W1: knows the concept of innovation and methods for assessing the level of innovation according to the Innovation Radar Platform, assessing technological readiness according to TRL (Technology Readiness Level) (K_W07) W2: Methods for the design of R&D activities based on the principles of research agenda preparation and project approach according to PMI methodology with principles for defining the work breakdown structure (WBS) and setting SMART milestones (K_W07) U1: will have the ability to assess the level of project innovation and to assess the technological readiness of the project (K_U01) U2: is able to prepare a research agenda, plan a work breakdown	Traditional lecture using PowerPoint presentations, case studies, discussions, exercises	Wrietin exam, continuous assessment (preparation for classes, homework and activity in the classroom)

		structure and set milestones according to the SMART principle (K_U01) K1: the rules of cooperation in order to achieve the project goals (K_K02) K2: Can point out the weaknesses of the project and the social consequences of the project (K_K04) K3: Can indicate what are the individual roles in the project, including the division of tasks in international teams (K_K04)		
	Legal regulations in the digital economy	W1: managing a project team responsible for transforming the organization (K_K04)knows the legal standards at an advanced level, including those relating to the protection of industrial property and copyright, which define the functioning of digital economy entities (K_W04) W2: managing a project team responsible for transforming the organization (K_K04)has knowledge of the impact of legal regulations on digitization on the functioning of the economy, society and the effects on the natural environment (K_W06) U1: managing a project team responsible for transforming the organization (K_K04)can use legal systems in the area of economic and financial decisions, taking into account the changes generated by the digitization of the economy (K_U03) K1: managing a project team responsible for transforming the organization (K_K04)is ready to comply with the rules of operation in accordance with the legal regulations on the protection of personal data and	Informative (conventional) lecture, conversational lecture, problematic lecture, multimedia presentation, introductory talk, discussion, film screening, case studies, discussion	Written examination; study, discussion and case study

		other legal regulations for the digital economy (K_K01)		
	Customer Experience	W1: knows the methods and tools of user experience research (K_W05, K_W08) W2: knows the principles, conditions, basic concepts and systems of customer relationship management (CRM) (K_W05, K_W08) U1: Is able to apply the following user experience (UX) techniques: basic qualitative research methods (in-depth interviews (IDI), usability testing), card sorting, and conducting stakeholder workshops (K_U01, K_U02) U2: Is capable of independently analyzing and assessing a company's situation and proposing solutions for building customer relationships (K_U02) U3: Is able to prepare a research report (K_U02, K_U07) K1: can work in a group (K_K01) K2: understands the need to create accessible and useful products and services (K_K03) K3: is able to plan management of customer relations (K_K03) K4: Can present a report (K_K01)	Informative (conventional) lecture, description, discussion, laboratory, project work, case study	Written examination, group project, group project presentation, activity, performing tasks

	Digital banking, payment systems, and FinTech	W1: classifies and explains the functioning of different types of electronic banking, types of payment services, and settlement systems, taking into account their financial, organizational, and technical aspects (K_W02) W2: recognizes a nd explains the mechanisms of digital financial services, including payment and settlement systems, as well as the roles and strategies of banks, other financial institutions, and non-bank FinTech players (K_W03) U1: is able to select appropriate statistical data and information from the market offerings for specific types of digital financial services, including e-banking, and present them clearly to the group for decision-making in a case study (K_U03) K1: is able to independently analyze the summary of offers for digital financial services and payment services, critically evaluating the received information (K_K03)	Informative (conventional), conversational, problem-based lecture, multimedia presentation, introductory talk, discussion, film screening, case studies, SWOT analysis, discussion	Written exam, presentations, discussion and case studies
	E-commerce	W1: knows the role of e-commerce in the digital economy (K_W06) W2: knows the differences between the various forms of e-commerce (K_W04) W3: lists and describes the determinants of e-commerce (K_W06) W4: describes the basic business models of e-commerce (K_W04) U1: is capable of identifying problems related to the use of various forms of e-commerce in business organizations (K_U01) U2: is capable of recommending solutions to specific problems arising in business organizations that use e-	Conventional lecture and problem-based lecture, a demonstration using an augmented reality (AR) device, discussion, case study	Written examination (lecture), presentation, exercises

		commerce (K_U01) K1: is ready to think and act in an entrepreneurial way in business organizations that use e-commerce (K_K02)		
	Introduction to Logistics and e-logistics tools	W1: managing a project team responsible for transforming the organization (K_K04)lists the goals, essence, nature and mutual connections of logistics and e-logistics (K_W07 W2: managing a project team responsible for transforming the organization (K_K04)effectively uses e-logistics tools and tracks the directions of development and external conditions of e-logistics (K_W07) W3: managing a project team responsible for transforming the organization (K_K04)defines the issues of the impact of e-logistics on the development of the digital economy and business connections on a national and international scale (K_W07) U1: managing a project team responsible for transforming the organization (K_K04)analyzes the applications of various types of tools and technical and structural solutions used in logistics and e-logistics (K_U01) U2: diagnoses a specific need for digitalization in the entity's logistics support system and selects appropriate tools for it (K_U01) U3: working in a team, strives to	Informative, problem-based and conversational lecture using a multimedia presentation, exercises	Written exam, test, case study, activity

		achieve the team's goals (K_U10) K1: is ready for analytical thinking and creative search for solutions to complex organizational problems that appear in the management of the company's logistics in the era of the digital economy (K_K02)		
	Behavioural finance	W1: Has an in-depth knowledge of the behaviour of individual and institutional investors (K_W02) U1: Has the ability to analyze financial phenomena in terms of human psychology (K_U05)	Informative lecture, problem lecture, demonstration with description, discussion, multimedia presentation, case study	Written exam, presentation
	Decentralized finance and crypto-assets	W1: has knowledge of the conditions for benefiting from decentralized digital assets (K_W01) W2: has knowledge of the costs and benefits of using blockchain and DLT technologies (K_W02) U1: has the ability to use various organizational and economic concepts for decentralized methods of storing and transferring value-over-Internet as well as conducting economic activity and economic exchange in this area (K_U01) K1: analytical thinking and creative search for solutions to complex organizational problems that arise during business activity based on Blockchain / DLT solutions - (K_K01)	Problem-based lecture, description, exercise, case study	Written exam, final tests

	Design thinking and creative business problem solving	W1: has a basic, practical knowledge of creativity and innovation, methods and activities used in them (K_W04, K_W07) W2: has basic knowledge of tasks and procedures related to creative processes, in particular design thinking (K_W07, K_W05) U1: can independently plan activities related to the process of creative problem solving in relation to professional situations (K_U09, K_U11) U2: can design and implement team activities related to creative processes (K_U11) K1: appreciates the importance of creativity and innovation in professional activities (K_K02, K_K04)	exercises, show, project, case study, exchange of ideas, experiences, a chat	Tasks performed independently on the Moodle platform, tasks performed independently and in groups during classes, project
	Public finance and tax system	W1: knows and understands at an advanced level the economic and financial structures and their institutions as well as the key effects of the activities of these institutions in the sphere of banking and financial markets (K_W03) W2: knows and understands at an advanced level the economic and financial norms and rules that define the functioning of entities in the banking sector and financial markets (K_W04) U1: is able to use normative systems (legal, economic, social) in the area of economic and financial decisions in the sphere of banking and financial markets, taking into account the changes generated by the digitization of the economy (K_U03)	Information lecture, problem lecture, presentation with description, discussion, multimedia presentation, case study	Written exam, essay/presentation and test

	Business communication II (including investor pitch)	W1: knows and understands the goals, essence, nature and interconnectedness of communication processes in the business world, including digital (K_W07) U1: using economic and financial terminology and related to the digitization of the economy, prepare speeches, using modern communication techniques (K_U07) U2: is able to use communication techniques for his own development and development of ongoing projects in the world of digital economy (K_U09) K1: is ready to critically evaluate the information received during sales presentations and other forms of speeches used in business practice (K_K03)	Case analysis, simulation game, chat, enactment, situational method, exercise method	Ongoing activity during classes, final presentation
	Anti-fraud, AML and KYC solutions in the digital economy and in digital assets	W1: has knowledge of compliance requirements with applicable laws, regulations, and supervisory practices concerning institutions operating in the financial market, particularly in areas such as anti-money laundering and financial fraud prevention (K_W01) W2 : understands the costs and benefits of implementing compliance solutions, including the use of new technologies (RegTech) to fulfill legal and supervisory obligations for institutions operating in the financial market (K_W02) U1: has the ability to use various technological tools in the field of compliance, as applied in financial market institutions (K_U01) K1: Identify risks, engage in analytical thinking related to anti-money laundering and other financial market abuses, and implement	Exercise, chat	Tests

		measures to mitigate such improper practices (K_K01)		
	Diploma seminar	W1: has subject matter knowledge of issues related to the digitisation of economic and financial processes (K_W02, K_W06, K_W07) W2: has advanced knowledge of methods and tools, including data acquisition techniques, used to describe structures and institutions within the digital economy (K_W01, K_W08) U1: has the ability to carry out logically coherent economic analyses of selected problems in the digital economy (K_U01, K_U02, K_U04, K_U05, K_U06) U2: has the ability to prepare typical written work in Polish in accordance with the requirements for a good thesis (K_U07) K1: enhances his/her ability to participate competently in discussions on relevant issues in the digitisation of the economy (K_K02, K_K03)	seminar method	Observation of progress in the preparation of the thesis

Detailed allocation of ECTS credits			
Academic or artistic disciplines, to which learning outcomes refer:			
	Artistic or academic discipline	**ECTS credits**	
		Number	**%**

1.	**Economics and Finance**	**114**	**63%**
2.	**Management and Quality Studies**	**66**	**37%**

Course modules	**Course**	**No. of ECTS credits**	**No. of ECTS credits in the discipline:**		**No. of ECTS credits for elective courses**	**No. of ECTS credits obtained by the student in classes conducted with direct contact with the teacher or tutor**	**No. of ECTS credits obtained by the student as a result of: courses related to academic activity within a discipline or disciplines, to which the field of study is assigned**
			Economics and Finance	**Management and Quality Studies**			
Module: General education	Intellectual Property Protection	1	1	0	0	0,5	1
	Contemporary Learning Techniques	1	1	0	0	0,5	1
	Business English	7	5	2	0	5	0
	Physical Training	0	0	0	0	0	0
	Humanities lectures	6	6	0	6	3	0
	University lectures	2	2	0	2	1	0
	Occupational Safety, Health and Ergonomics	0	0	0	0	0	0
	Information Technology I	3	2	1	0	1,5	0
	Information Technology II	3	2	1	0	1,5	0
Unit Basic Subjects	Applied mathematics	7	5	2	0	3,5	7
	Statistics in economic studies	7	5	2	0	3,5	7
	Econometrics and forecasting	7	5	2	0	3,5	7
	Introduction to economics in the digital economy	5	5	0	0	2,5	5
	Business law	2	1	1	0	1	1
	Management in the digital economy	2	0	2	0	1	2
	Marketing and marketing research	3	0	3	0	1,5	3

Unit Main Course Subjects	Basics of banking and financial markets	5	5	0	0	2,5	5
	Corporate finance	7	5	2	0	3,5	7
	Introduction to artificial intelligence	2	2	0	0	1	0
	Business start-up and business plan	3	0	3	0	1,5	3
	Digital technologies in economy and finance	4	3	1	0	2	4
	Cybersecurity	4	2	2	0	2	4
	Business data visualisation	3	1	2	0	1,5	1
	Management Information Systems	5	0	5	0	2,5	5
	E-government	2	1	1	0	1	2
	Digital economy business models	4	2	2	0	2	4
	Project management	5	0	5	0	2,5	5
	Industry 4.0	3	2	1	0	1,5	3
	Digital transformation of the economy and sustainable development	2	2	0	0	1	2
	Ethics in business and technology	2	1	1	0	1	1
	Communication in business I	3	0	3	0	1,5	3
Specialisation Data Science in Business	Introduction to scripting languages - Python and R	3	3	0	3	1,5	3
	Managing data and data systems in the organization	4	1	3	4	2	4
	Software for business analysis	3	2	1	3	1,5	3
	Big data processing	4	0	4	4	2	3
	Introduction to data science and machine learning	3	2	1	3	1,5	3
	Unsupervised learning in economic applications	5	4	1	5	2,5	5
	Predictive analytics	5	4	1	5	2,5	5
	Time series analysis	3	2	1	3	1,5	3
	Non-classical forecasting methods	5	4	1	5	2,5	5
	Text analytics of data from social media	2	2	0	2	1	2
	Network analysis and recommender systems	4	3	1	4	2	3

	RPA and chatbots	2	1	1	2	1	1
	Data driven decisions	2	1	1	2	1	2
	Management and implementation of data science projects	2	1	1	2	1	1
	Multi-criteria mangerial decision aiding	3	0	3	3	1,5	3
	Statistical methods of survey data	3	0	3	3	1,5	3
	Methods and models for spatial data analyses	4	3	1	4	2	4
	Financial econometrics	3	3	0	3	1,5	3
Specialisation Digital Innovations in Business & FinTech	Digital transformation of enterprises and transformation pla	4	2	2	4	2	4
	Entrepreneurship and development of startups	5	3	2	5	2,5	5
	Innovative projects and fundraising for R&D	6	3	3	6	3	6
	Legal regulations in the digital economy	3	2	1	3	1,5	0
	Customer Relationship Management & User Experience	6	3	3	6	3	6
	Digital banking, payment systems, and FinTech	6	6	0	6	3	6
	E-commerce	5	3	2	5	2,5	5
	Introduction to logistics and e-logistics tools	2	1	1	2	1	2
	Behavioural finance	3	3	0	3	1,5	3
	Decentralized finance and crypto-assets	6	5	1	6	3	6
	Design thinking and creative business problem solving	5	2	3	5	2,5	5
	Public finance and tax system	4	4	0	4	2	4
	Business communication II (including investor pitch)	3	1	2	3	1,5	3
	Anti-fraud, AML and KYC solutions in the digital economy and in digital assets	2	2	0	2	1	0

Seminar	Diploma seminar	10	10	0	10	5	10
	Data Science in Business	180	112	68	78	91,5	149
	%	100%	62%	38%	43%	51%	83%
	Digital Innovations in Business&FinTech	180	116	64	78	91,5	148
	%	100%	64%	36%	43%	51%	82%
		100%	63%	37%	43%	51%	83%

Title of subject	Programme contents
Intellectual property protection	Concept and scope of intellectual property International treaties and conventions Fields of intellectual property protection Requirements and limitations of intellectual property protection
Contemporary learning techniques	Kolb's learning cycle Reading strategies Note-taking methods and creative thinking techniques Memorizing techniques
Business English	Organisations and their structures; Company types Supply chain management Quality management Marketing Strategy Customer relationship management Accounting Finance Presentations Job Application Writing Business Emails Business Meetings
Physical training	depends on the chosen course
Huminities lectures	depends on the chosen lecture
University lectures	depends on the chosen lecture
Occupational safety, health and ergonomics	potential threats in the place of study and stay, factors harmful to health, burdensome and dangerous - prevention introduction to ergonomics, fire protection, first aid rules
Information technology I	Using web services and cloud tools Editing texts in MS Word, including working with long documents Creating formulas and functions in MS Excel Importing data from various sources and visualizing results Automating processes in a spreadsheet program
Information technology II	Introduction to the basics of modern communication - network topology Advanced data analysis using a spreadsheet program Data management in an organisation - how to increase productivity Decentralised data processing and work optimisation

Applied mathematics	Matrix Algebra Number Sequences Functions of One Variable Functions of Several Variables Applications of Mathematics in Economics and Finance
Statistics in economic studies	Descriptive statistics Fundamentals of statistical inference Correlation and regression analysis Measures of the dynamics of phenomena
Econometrics and forecasting	Basic concepts in econometrics and forecasting. Stages of building an econometric model. Estimation and verification of single-equation econometric models. Construction of multi-equation econometric models, issues of specification, estimation, and verification. Econometric prediction.
Introduction to economics in the digital economy	Economics - definitional considerations Consumer Producer Factor markets Selected phenomena in the economy
Business law	The term and sources of business law in Poland Freedom of economic activity. Rights and obligations of entrepreneurs. Legal protection of competition and consumers Legal forms of economic activity Selected contracts in business transactions Settlement of commercial disputes
Management in the digital economy	Foundations of management theory Enterprise management Digitization of business processes Contemporary management concepts
Marketing and marketing research	Elements of strategic marketing Elements of operational marketing Sources of information in marketing research Steps in the marketing research process
Basics of banking and financial markets	Banking sector and financial market institutions in Poland Banking activities of acquiring and investing funds Security of banking transactions Central banking and monetary policy Digitization in the banking sector

Corporate finance	Basic objectives and tools of corporate financial management Time value of money Structure of assets, capital, costs and results in the company Capital and funds of business entities Cost of capital
Introduction to artificial intelligence	Key AI Concepts Knowledge Search and Representation, Human Thinking Forms of Knowledge Representation Machine Learning and Knowledge Discovery in Data Natural Language Understanding, Transformers, Large Language Models Examples of Business Applications
Business start-up and business plan	Legal aspects of business activity Business plan as a tool for designing business activity Managerial aspects of business activity
Digital technologies in economy and finance	Development of Digital Technologies and Computer Networks Cloud Solutions, E-commerce, CRM, ERP Systems, API Technologies, and Open API Data Analysis Technologies: Big Data, Data Mining, Digital Twins, IoT, and Cloud Computing for Scalable Systems Artificial Intelligence, Blockchain, and DLT
Cybersecurity	Terminology, rules and security policy Main types of cyber attacks and ways to defend against them Security systems and methods Personal data protection Cyber risk management in accordance with ISO 27001
Business data visualisation	Methods and techniques of data visualization Data modeling and importing Creating management dashboards Data analysis and visualization in Qlik Sense Presentation and sharing of reports
Management Information Systems	Information model of the organization Business processes and their modeling on the BPMS platform IT systems - choosing the right tool Transactional systems - architecture and implementation strategies RDBMS systems - overview ERP class systems - features of system classification to ERP class, typical system solutions - standard and dedicated Practice of using ERP class systems - work in selected ERP class systems (SAP 4 / HANA, COMARCH OPTIMA) Other core transactional systems review (CRM, SCM, WMS, MES)

E-government	The essence and stages of development of digital administration Social and technological challenges of e-government E-services in public administration
Digital economy business models	Development of Digital Technologies and Computer Networks Cloud Solutions, E-commerce, CRM, ERP Systems, API Technologies, and Open API Data Analysis Technologies: Big Data, Data Mining, Digital Twins, IoT, and Cloud Computing for Scalable Systems Artificial Intelligence, Blockchain, and DLT
Project management	Selected project management approaches Functional, institutional and personnel project management IT methods and tools used in project management
Industry 4.0	Economic transformations of the 20th and 21st centuries. The concept of the fourth industrial revolution. Distinguishing features of Industry 4.0. The impact of digital technologies on business development. Transformation of a company towards Industry 4.0 according to the European Commission. Catalogue of key competences ensuring implementation of Industry 4.0 assumptions - identification of processes creating value for the customer , increasing role of people (employees) at all levels of organisation, customer orientation and introduction of personalised offerings
Digital transformation of the economy and sustainable development	Concepts of the digital economy and sustainable development. Policies of digital economic transformation and sustainable development. The impact of digital transformation on the economy, society, and the environment
Ethics in business and technology	Ethical business Fair profit Honest work Sustainable development Corruption Unfair competition Sexual harassment Anti-discrimination and anti-bullying measures Ethical leadership
Communication in business I	Psychology and theories of communication Internal communication Business negotiations Influence and persuasion Transactional analysis Effective written communication Negotiations

Data Science in Business	
Introduction to scripting languages - Python and R	Basics of scripting languages programming Writing scripts, automating data analysis processes Code optimization - function, module, library File operations, data analysis
Managing data and data systems in the organization	Database design - from modeling to physical implementation Database management - process optimization and data control Database reporting - query language Data acquisition - forms (validation) as the key to effective data collection
Software for business analysis	Data transformation and cleaning Data exploration and patterns Machine learning in analytics Visualization and reporting Process automation
Big data processing	Big Data MapReduce algorithm Apache Hadoop and Spark Decentralized Data Processing Architecture of decentralized systems
Introduction to data science and machine learning	Data science environment - basics of artificial intelligence and statistical learning theory Introduction to the methodology of machine learning - key problems of working with data Taxonomy of data mining tasks and machine learning mechanisms Methodology of the data mining process - the CRISP-DM process Types of data and their forms used in data science The data mining pipeline Data understanding Data preparation (handling missing data, dimensionality reduction, coding, grouping, data transformations, feature engeneering)
Unsupervised learning in economic applications	The essence of unsupervised learning Market basket analysis Association rules Discovering associations in economic processes Measuring multidimensional economic processes - a taxonomic measure of development Linear ordering Cluster analysis

Predictive analytics	The essence and fundamental concepts of predictive analytics Classification and regression tasks Predictive model Selected machine learning algorithms in predictive analytics Validation and optimization of prediction models
Time series analysis	Visualization and decomposition of time series Time series models Time series forecasting Practical applications and programming
Non-classical forecasting methods	Time series models in R (modelling and forecasting) Selected extrapolation methods Non-classical forecasting methods Forecasting using multi-equation models
Text analytics of data from social media	Text Data Preprocessing Text classification and Cluster analysis Topic modeling Text Similarity and Matching Named Entity Recognition Large Language Models
Network analysis and recommender systems	Elements of graph theory Social networks as a special case of complex networks Construction and applications of recommender systems
RPA and chatbots	The essence of software robots, Robotic automation of business processes, Using the UiPath platform to create robots, Process automation in Python
Data driven decisions	Deciding, the process of making good managerial decisions, data-based decision-making, analytical approach within OR / MS / DS / SS Introduction to optimization tools: MS Solver and Google OR-Tools Probabilistic and non-probabilistic decision rules, assessment of decision situations, implementation rules, decision trees, information value Models of mathematical programming Selected network and combinatorial models Selected models of inventory optimization

Management and implementation of data science projects	Project Management Methods in Data Science Measuring the Effectiveness of Data Science Projects Data Management in Data Science Projects Optimization of Costs and Resources in Analytical Projects Automation and MLOps in Data Science
Multi-criteria mangerial decision aiding	Introduction to multi-criteria decision aiding Selected methods of determining the weights for the criteria Selected discrete multi-criteria methods
Statistical methods of survey data	Survey research Determining sample size Statistical analysis of survey data Measurement scales Sample selection
Methods and models for spatial data analyses	Spatial data visualization methods Descriptive statistics of spatial distributions of variables Spatial structure of economic processes Spatial modeling Spatial spillover effects
Financial econometrics	Univariate models of stationary stochastic processes Univariate and multivariate models of non-stationary stochastic processes Financial time series characteristics Univariate volatility models
Diploma seminar	Principles of dissertation writing Principles of citation of references Methods of conducting own research
Digital innovations in business &FinTech	
Digital transformation of enterprises and transformation plan	Business transformation and digitalisation - optimising, adapting and integrating all company processes taking into account the environment. Digital transformation and Industry 4.0 . Digital and technology maturity assessment - enterprise perspective, technical and economic aspects of technology assessment. Technology readiness levels and organisational and financial implications of digital transformation. The importance of digital competence for business development.

Entrepreneurship and development of startups	The essence of entrepreneurship and the functioning of start-ups The role of entrepreneurship in building start-ups Building a business concept for start-ups Shaping the business model for start-ups
Innovative projects and fundraising for R&D	Basic concepts in innovation management. Methods for assessing a company's level of innovation: technology readiness levels (TRL). Concept of Stage-Gate process, Research Agenda and WBS. Searching for sources of funding for innovation implementation. Analysis of competition requirements and preparation of simple funding applications.
Legal regulations in the digital economy	Legal Regulations and the Development of the Digital Economy Consumer in the Digital Economy – E-commerce, personal data Consumer Protection in E-commerce and the Role of Regulators Regulations on Modern Financial Services and Digital Identity Regulations on Payment Services, Cryptocurrencies, and Online Financing Regulations on Cybersecurity and Emerging Technologies
Customer Experience	Basic concepts in innovation management. Methods for assessing a company's level of innovation: technology readiness levels (TRL). Concept of Stage-Gate process, Research Agenda and WBS. Searching for sources of funding for innovation implementation. Analysis of competition requirements and preparation of simple funding applications.
Digital banking, payment systems, and FinTech	Digital Banking and Its Evolution Payment System and the Payment Services Market Open banking and open finance FinTech Sector – Business Models and Technologies The Impact of Technology on Financial Services
E-commerce	Basic concepts in innovation management. Methods for assessing a company's level of innovation: technology readiness levels (TRL). Concept of Stage-Gate process, Research Agenda and WBS. Searching for sources of funding for innovation implementation. Analysis of competition requirements and preparation of simple funding applications
Introduction to logistics and e-logistics tools	Origin, history and essence of logistics Logistics processes and systems The essence of e-logistics and its relations with e-business E-logistics versus industry 4.0 Technical and IT aspects of electronic support systems Electronic data interchange and automatic identification systems

Behavioural finance	Rationality and utility - choices under deterministic conditions Risk. Perspective Theory Heuristics Anomalies as deviations from market efficiency Mental accounting
Decentralized finance and crypto-assets	Decentralized online digital assets Tokenomics Microeconomics of ventures based on the digital asset market Macroeconomics and the digital asset market
Design thinking and creative business problem solving	Creatyvity Innovativeness Design thinking Creative process Heuristics
Public finance and tax system	Public funds and the importance of tax revenues Public expenditure State budget Local government budgets Public finance institutions and instruments Public deficit and debt Public finance and private finance - analysis of connections and dependencies
Business communication II (including investor pitch)	Elevator pitch and self-presentation Personal branding in business Effective business presentations Storytelling and persuasion Public speaking and body language
Anti-fraud, AML and KYC solutions in the digital economy and in digital assets	Identification and Analysis of Risks in Financial Markets Compliance and Technological Tools Reporting to State Institutions and Legal Regulations Detection and Prevention of Financial Fraud
Diploma seminar	Principles of dissertation writing Principles of citation of references Methods of conducting own research

This study programme is effective as of the winter semester of the academic year 2025/2026.