LEARNING OUTCOMES FOR THE PROGRAM IN
Data Engineering
undergraduate studies – general academic profile

Positioning of major in the study area:

The programme in Data Engineering belongs to the area of *exact sciences*, the field of *physical sciences*, the discipline of *physic* and the field of *mathematical sciences*, the discipline: *mathematics* and *computer science*.

Abbreviations – Description of used of signs:

ID (before underscore) - learning outcomes
1 (before underscore) - Undergraduate studies
A (before underscore) - general academic profile
W (after underscore) - Category "Knowledge"
U (after underscore) - Category "Abilities"
K (after underscore) - Category "Social competences"
01, 02, 03 and next **(**after underscore) – number of learning outcome

Codes of learning outcomes for the program	**After completing a degree in *Data Engineering* the graduate:**	**Reference to the learning outcomes:**			
		universal characteristics for a given level of the Polish Qualifications Framework (Act on ZSK)	second level characteristics for a given level of the Polish Qualifications Framework (the Polish Ministry of Science and Higher Education regulation)	second level characteristics for a given area and profile of the Polish Qualifications Framework (the Polish Ministry of Science and Higher Education regulation)	characteristics of the second degree of the Polish Qualifications Framework for qualifications including engineering competences (the Polish Ministry of Science and Higher Education Regulation)
in terms of **KNOWLEDGE**					
ID1A_W01	has knowledge of the basics of higher mathematics, including mathematical analysis, logic, linear algebra and discrete mathematics	P6U_W	P6S_WG	P6S_WG	
ID1A_W02	knows the basics of probability calculus, stochastic processes and mathematical statistics, basic methods of inference and statistical modeling	P6U_W	P6S_WG	P6S_WG	
ID1A_W03	knows terminology, symbolism, basic concepts and physical laws	P6U_W	P6S_WG	P6S_WG	
ID1A_W04	possesses knowledge in the field of physics enabling understanding of physical phenomena and processes as well as their application in science and technology	P6U_W	P6S_WG P6S_WK	P6S_WG P6S_WK	P6S_WG
ID1A_W05	has basic knowledge of electrotechnics, electronics and metrology	P6U_W	P6S_WG	P6S_WG	P6S_WG
ID1A_W06	has knowledge of information technology used in data analysis	P6U_W	P6S_WG	P6S_WG	P6S_WG
ID1A_W07	knows the basic methods, techniques and programming tools used to solve engineering tasks in the field of data analysis	P6U_W	P6S_WG	P6S_WG P6S_WK	P6S_WG
ID1A_W08	knows basic numerical methods and data analysis algorithms	P6U_W	P6S_WG	P6S_WG	

ID1A_W09	has a structured, theoretically founded knowledge in the field of databases	P6U_W	P6S_WG	P6S_WG	
ID1A_W10	has in-depth specialist knowledge in the field of the specialty studied	P6U_W	P6S_WG	P6S_WG	
ID1A_W11	has basic knowledge of related disciplines related to the studied specialty	P6U_W	P6S_WG	P6S_WG	
ID1A_W12	has the basic knowledge and skills to use professional literature, databases and other sources of information to obtain the necessary information and the basic ability to assess the reliability of the obtained information	P6U_W	P6S_WG P6S_WK	P6S_WG P6S_WK	
ID1A_W13	has basic knowledge necessary to understand social, economic and other non-technical conditions of engineering activities	P6U_W	P6S_WK	P6S_WK	P6S_WK
ID1A_W14	has elementary knowledge in the field of industrial property protection, copyright law and is able to use patent information resources; knows the basic principles of health and safety at work	P6U_W	P6S_WG P6S_WK	P6S_WG P6S_WK	
ID1A_W15	has elementary knowledge about designing the path of own development and forms of individual entrepreneurship in the field of data engineering	P6U_W	P6S_WG P6S_WK	P6S_WG P6S_WK	P6S_WK
in terms of **ABILITIES**					
ID1A_U01	can use a mathematical apparatus to formulate and solve typical tasks in the field of data analysis	P6U_U	P6S_UW	P6S_UW	P6S_UW
ID1A_U02	is able to analyze and explain observed physical phenomena and processes	P6U_U	P6S_UW	P6S_UW	P6S_UW
ID1A_U03	is able to use basic physical instruments and apparatus to plan and perform physical measurements with the assessment of the reliability of the determined physical values; identifies measuring techniques	P6U_U	P6S_UW	P6S_UW	P6S_UW
ID1A_U04	is able to build a measuring system based on the presented diagram and make measurements, can design and build an electrical and electronic circuit and a simple technical device	P6U_U	P6S_UW	P6S_UW	P6S_UW
ID1A_U05	can interpret and explain relationships included in the form of formulas, tables, charts, diagrams and apply them in practical issues	P6U_U	P6S_UW	P6S_UW	P6S_UW
ID1A_U06	knows how to use selected IT technologies to collect, search, analyze and visualize data	P6U_U	P6S_UW	P6S_UW	P6S_UW
ID1A_U07	uses a selected high level programming language and appropriate IT tools in the form of computer programs in the field of data engineering	P6U_U	P6S_UW P6S_UK P6S_UO P6S_UU	P6S_UW	P6S_UW
ID1A_U08	is able to analyze and solve typical problems related to the studied specialty and find solutions using known methods	P6U_U	P6S_UW	P6S_UW	P6S_UW
ID1A_U09	has the ability to plan and perform basic scientific research as part of his specialty and analyze their results	P6U_U	P6S_UW	P6S_UW	P6S_UW
ID1A_U10	knows the English language to the extent necessary to use the basic professional literature in the field of data engineering in accordance with the requirements set for the B2 level of the European System of Language Description	P6U_U	P6S_UK	P6S_UW	
ID1A_U11	has the ability to obtain information from literature, databases and other sources, integrate this information, interpret and draw conclusions and formulate opinions	P6U_U	P6S_UW P6S_UU	P6S_UW	P6S_UW
ID1A_U12	can present current issues related to data engineering, including a short presentation in Polish and English using various sources of knowledge and multimedia resources	P6U_U	P6S_UW P6S_UK	P6S_UW	P6S_UW
ID1A_U13	he knows how to organize his own work properly and is able to work together and work in a team with responsibility for his own and for the tasks he has carried out jointly	P6U_U	P6S_UO P6S_UU		P6S_UW
ID1A_U14	has the ability to prepare a written description/project on specific issues related to the studied specialty using the basic theoretical concepts and data engi-	P6U_U	P6S_UW P6S_UO	P6S_UW	P6S_UW

	neering methods using different sources of information				
ID1A_U15	identifies problems related to the profession, understands the need to raise professional and personal competences, can implement the process of self-education	P6U_U	P6S_UU	P6S_UW	P6S_UW
In terms of **SOCIAL COMPETENCES**					
ID1A_K01	can define priorities for the task and plan work	P6U_K	P6S_KK P6S_KR		
ID1A_K02	is aware of the need to comply with the principles of professional ethics and respect for the law, including copyrights	P6U_K	P6S_KR		
ID1A_K03	understands the social aspects of the practical application of the acquired knowledge and the need to popularize selected achievements of science and technology	P6U_K	P6S_KO		
ID1A_K04	is able to formulate and argue opinions on professional issues, is innovative, solves problems with the inclusion of socio-economic effects, works in an entrepreneurial way	P6U_K	P6S_KK P6S_KO		