



Lodz University
of Technology

Study programme

Faculty:	Faculty of Technical Physics, Information Technology and Applied Mathematics
Major:	Information Technology (in English)
Level of study:	first-cycle programme (inżynier)
Form of study:	full-time studies
Academic year:	2026/27

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Basic information

Name of the field of study:	Information Technology (in English)
Level of study:	first-cycle programme (inżynier)
Study profile:	general academic
Form of studies:	full-time studies
Duration of studies (number of semesters):	7
The number of ECTS points required to complete studies:	210
Total number of hours of classes:	2673
The number of ECTS points a student obtains as part of classes conducted with the direct participation of academic teachers or other persons conducting classes:	107
Professional title awarded to graduates:	inżynier
ISCED code:	0613
Language of study:	English

Assigning the course to the disciplines to which the learning outcomes relate

Discipline	Percentage share
Technical computing and telecommunications	100%

Learning outcomes (in relation to the PQF)

No.	Learning outcome code	Learning Outcome Content	Reference to the universal characteristics of the first level of PRK	Reference to the second-level characteristics of the PRK, taking into account the second-level characteristics enabling the acquisition of engineering competences
1	1ITC1	Knows and understands, at an advanced level, technologies, methods and tools used in the design, deployment and maintenance of IT systems, including operating systems, networks, databases and applications.	P6U_W	P6S_WG
2	1ITC2	Knows and understands professional responsibilities in the IT field as well as legal, ethical, security and economic conditions related to the life cycle of IT systems and services, including data protection and intellectual property.	P6U_W	P6S_WK
3	1ITC3	Can analyse requirements, design and implement IT solutions that meet functional and non-functional requirements, taking into account security, reliability and usability.	P6U_U	P6S_UW
4	1ITC4	Can integrate software components and services (e.g. databases, APIs, external systems), configure environments and automate software development and deployment processes (e.g. CI/CD).	P6U_U	P6S_UW
5	1ITC5	Can acquire, organise, process and analyse data, and present results in the form of reports and visualisations supporting technical and business decisions.	P6U_U	P6S_UW
6	1ITC6	Can diagnose problems in IT systems and infrastructure, plan tests and measurements, analyse root causes, and propose and implement improvements.	P6U_U	P6S_UW
7	1ITC7	Can communicate effectively with technical and non-technical audiences, prepare technical documentation, and present and justify design decisions, also a foreign language, including English, at a proficiency level consistent with the Common European Framework of Reference for Languages (CEFR).	P6U_U	P6S_UK
8	1ITC8	Is ready for responsible professional conduct in IT, recognises ethical and legal dilemmas, complies with data protection and security principles, and considers the social and economic impact of IT solutions.	P6U_K	P6S_KR
9	1ITC9	Is ready to work effectively in a project team, including interdisciplinary environments, co-creates goals, plans tasks, shares responsibility and supports a culture of collaboration and inclusion.	P6U_U, P6U_K	P6S_UO, P6S_KK
10	1ITC10	Is ready for self-directed learning and adaptation to technological change, can identify competence gaps, select learning strategies and apply new knowledge in IT practice.	P6U_U, P6U_K	P6S_UU, P6S_KO

Matrix of course modules in relation to learning outcomes and curriculum content

No.	Course name	Program content	1ITC1	1ITC2	1ITC3	1ITC4	1ITC5	1ITC6	1ITC7	1ITC8	1ITC9	1ITC10
1	Artificial Intelligence Tools for Academic Work	Application of artificial intelligence tools in academic workflows and research activities. Use of AI systems for supporting scientific writing, literature review, information extraction, paraphrasing and summarisation. Analysis of capabilities and limitations of generative tools in the context of research reliability. Evaluation of ethical risks.	x				x					
2	Algorithms and Programming Fundamentals	Fundamental concepts of algorithms and programming in the context of solving computational problems. Construction of algorithms using control structures and basic data structures. Methods for evaluating correctness and efficiency, including time and space complexity analysis. Designing readable and modular code according to programming best practices. Implementation of algorithms in practical tasks and verification of their behaviour.	x		x							
3	Script Programming	Scripting languages in applications. Syntax, data types, control structures, functions, modules and fundamentals of modular programming. Processing of textual and structured data, file operations, exception handling and use of standard and external libraries. Applications of scripting languages in building development tools, process automation, data analysis and rapid prototyping of IT solutions.				x	x					
4	Physics	Foundations of scientific methodology and mathematical tools used in physics. Kinematics and dynamics of particles and rigid bodies. Gravitational field, oscillations and wave motion. Electrostatics and electrical properties of matter. Magnetic and electromagnetic fields.			x		x					
5	Engineering Drawing	Technical drawing as a formalised language of engineering communication. Principles of sketching and fundamentals of projection. Dimensioning principles. Analysis of drawing correctness and identification of dimensioning errors.					x					
6	Mathematics 1	Fundamentals of mathematical logic, complex numbers, elementary functions, complex function, inverse function, number sequences, differential calculus, integral calculus, linear algebra, analytic geometry, number series in real domain, function series.	x				x					
7	Study Skills for University	Organisation of studies at the IFE, familiarising students with the basic tools and techniques necessary in the study process and the principles of academic culture. Presenting of general educational concept of the programme of study.									x	x
8	C1 Business Communication for Engineers 1	Selected lexical and grammatical structures; topics relevant to the academic and professional environments of university graduates; improving receptive and productive language skills; developing essential soft skills required in the workplace.							x			
9	C2 Business Communication for Engineers 1	Selected lexical and grammatical structures; topics relevant to the academic and professional environments of university graduates; improving receptive and productive language skills; developing essential soft skills required in the workplace.							x			
10	Object Oriented Programming	Object-oriented programming as a paradigm for modelling software systems. Designing classes and objects using encapsulation, inheritance and polymorphism principles. Modularity, class responsibilities and dependency management. Testing and refactoring object-oriented applications. Developing applications with clear structure and extensibility.			x	x						

No.	Course name	Program content	1ITC1	1ITC2	1ITC3	1ITC4	1ITC5	1ITC6	1ITC7	1ITC8	1ITC9	1ITC10
11	Electronics Foundation	Fundamental properties of electronic components and their operating characteristics. Analysis of basic analogue and digital circuits. Interpretation of electronic schematics and relationships between circuit elements. Measurement of electrical parameters and evaluation of circuit performance. Practical verification of theoretical issues in laboratory conditions.	x		x							
12	Operating Systems	Architecture of modern operating systems and their role in managing computer resources. Process, memory and file system management with attention to performance and security. Synchronisation mechanisms and inter-process communication. Interaction between the operating system, hardware and users. System configuration analysis and diagnosis of basic operational issues.	x					x				
13	Computer Aided Design	Fundamentals of technical drawing, including drawing sheet formats and principles of computer graphics representation in engineering documentation. The AutoCAD environment, its interface and basic operations enabling precise technical drawing. Planar geometric constructions and drawing organisation using layers and blocks. Dimensioning of technical drawings. Preparation of documentation for printing and basic settings of the drawing publication process.					x					
14	Modern Physics	Fundamentals of optics: basic properties of light, electromagnetic waves, reflection, refraction, interference, and diffraction. Quantum mechanics: wave-particle duality, the Schrödinger equation, wave function and its probabilistic interpretation, basic quantum systems. Atomic structure: models of the atom, quantized energy levels, electron orbitals, and atomic spectra. Nuclear physics: structure of the atomic nucleus, radioactivity, nuclear decay, fission, and fusion processes. Special theory of relativity: postulates of special relativity, time dilation, length contraction, mass-energy equivalence. Cosmology: large-scale structure of the Universe, expansion of the Universe, Big Bang theory.						x				x
15	Mathematics 2	Mathematical analysis of multivariable functions and tools for describing multidimensional phenomena. Partial derivatives, gradient, directional derivatives and elements of optimization in technical tasks. Multiple integrals, vector fields and basic applications in modelling physical and engineering processes. Geometric interpretation of concepts and working with approximation and linearization near a point. Solving problem-oriented tasks that develop formal description and analysis of complex relationships.	x				x					
16	C1 Business Communication for Engineers 2	Deepening business communication competences in technical and engineering projects. Advanced forms of presentations, argumentation and negotiations in English. Communication in multicultural teams: meeting facilitation, conflict resolution and agreement building. Analysis of communication strategies in typical business and project situations. Improving precision and coherence in written and oral communication, including project materials.							x			
17	C2 Business Communication for Engineers 2	Deepening business communication competences in technical and engineering projects. Advanced forms of presentations, argumentation and negotiations in English. Communication in multicultural teams: meeting facilitation, conflict resolution and agreement building. Analysis of communication strategies in typical business and project situations. Improving precision and coherence in written and oral communication, including project materials.							x			
18	Civic Knowledge and Engagement I	Fundamental issues of civil society functioning in the context of contemporary social and technological challenges. Analysis of selected social problems, participation mechanisms and forms of engagement.		x						x		

No.	Course name	Program content	1ITC1	1ITC2	1ITC3	1ITC4	1ITC5	1ITC6	1ITC7	1ITC8	1ITC9	1ITC10
19	Component Programming	Design and implementation of software components as building blocks of larger IT systems. Principles of modularity, separation of concerns and code reuse in software projects. Interface contracts, dependency management and component integration within an application. Unit and integration testing of modules and techniques for ensuring quality and stability of changes. Analysis of component-based architectures and critical assessment of design trade-offs.			x							
20	Network Security	Threats and security models for computer networks and communication systems. Protection mechanisms at network and application layers, including access control, segmentation and monitoring. Fundamentals of cryptography in communication, security protocols and key management from a systems perspective. Analysis of vulnerabilities, attack scenarios and methods for detecting and mitigating incidents. Principles for designing and assessing network architectures with respect to confidentiality, integrity and availability.		x				x		x		
21	Computer Architecture and GPU Programming	Structure and operating principles of modern computer systems from a hardware architecture perspective. Processor organization, memory hierarchy, input/output mechanisms and how architecture affects program performance. Differences between CPU and GPU processing and parallelism models typical for compute accelerators. Fundamentals of GPU parallel programming: problem decomposition, memory management and synchronization. Performance analysis and identification of bottlenecks in parallel computing tasks.	x					x				
22	Mathematics for Applied Computer Science	Application of mathematical tools in modelling and analysing computer science problems. Elements of linear algebra, mathematical analysis and probability useful in algorithms, graphics, data analysis and machine learning. Formulating computational problems using mathematical models and interpreting results. Working with spaces, matrices, transformations and uncertainty measures in engineering contexts. Solving tasks focused on selecting appropriate mathematical tools for a given problem and computational constraints.					x					x
23	Database Design and Programming	Relational database design and fundamentals of implementing database solutions. Data modelling, normalization and selection of table structures aligned with application requirements. Query languages and data integrity mechanisms, including constraints, transactions and concurrency control at a conceptual level. Query analysis and optimization and assessing how design decisions affect performance and scalability. Practical tasks: schema design, implementation and verification of data operations.	x				x					
24	Interdisciplinary Problem-Based Learning Project	Implementation of a problem-based project during workshop classes. Teams of 4-5 people — students from different fields of study. Project topics — practical, not strictly related to a specific field of study. The classes develop students' soft skills (including creativity, teamwork, time management, problem solving) as well as the ability to use tools that support project work.							x		x	
25	German A2 block I	Development of language competences in academic and technical contexts, with emphasis on working with foreign-language sources. Improving reading comprehension, writing and oral communication in situations typical for studies and engineering work. Expanding specialist vocabulary and practising language structures used to describe processes, technologies and outcomes. Working with short practical forms (e.g., summaries, e-mails, task descriptions) and elements of presentations. Building accuracy, fluency and appropriate register in communication.							x			

No.	Course name	Program content	1ITC1	1ITC2	1ITC3	1ITC4	1ITC5	1ITC6	1ITC7	1ITC8	1ITC9	1ITC10
26	German B1 block I	Development of language competences in academic and technical contexts, with emphasis on working with foreign-language sources. Improving reading comprehension, writing and oral communication in situations typical for studies and engineering work. Expanding specialist vocabulary and practising language structures used to describe processes, technologies and outcomes. Working with short practical forms (e.g., summaries, e-mails, task descriptions) and elements of presentations. Building accuracy, fluency and appropriate register in communication.							x			
27	German B2 block I	Development of language competences in academic and technical contexts, with emphasis on working with foreign-language sources. Improving reading comprehension, writing and oral communication in situations typical for studies and engineering work. Expanding specialist vocabulary and practising language structures used to describe processes, technologies and outcomes. Working with short practical forms (e.g., summaries, e-mails, task descriptions) and elements of presentations. Building accuracy, fluency and appropriate register in communication.							x			
28	Spanish A2 block I	Development of language competences in academic and technical contexts, with emphasis on working with foreign-language sources. Improving reading comprehension, writing and oral communication in situations typical for studies and engineering work. Expanding specialist vocabulary and practising language structures used to describe processes, technologies and outcomes. Working with short practical forms (e.g., summaries, e-mails, task descriptions) and elements of presentations. Building accuracy, fluency and appropriate register in communication.							x			
29	Spanish B1 block I	Development of language competences in academic and technical contexts, with emphasis on working with foreign-language sources. Improving reading comprehension, writing and oral communication in situations typical for studies and engineering work. Expanding specialist vocabulary and practising language structures used to describe processes, technologies and outcomes. Working with short practical forms (e.g., summaries, e-mails, task descriptions) and elements of presentations. Building accuracy, fluency and appropriate register in communication.							x			
30	Spanish B2 block I	Development of language competences in academic and technical contexts, with emphasis on working with foreign-language sources. Improving reading comprehension, writing and oral communication in situations typical for studies and engineering work. Expanding specialist vocabulary and practising language structures used to describe processes, technologies and outcomes. Working with short practical forms (e.g., summaries, e-mails, task descriptions) and elements of presentations. Building accuracy, fluency and appropriate register in communication.							x			
31	French A2 block I	Development of language competences in academic and technical contexts, with emphasis on working with foreign-language sources. Improving reading comprehension, writing and oral communication in situations typical for studies and engineering work. Expanding specialist vocabulary and practising language structures used to describe processes, technologies and outcomes. Working with short practical forms (e.g., summaries, e-mails, task descriptions) and elements of presentations. Building accuracy, fluency and appropriate register in communication.							x			
32	French B1 block I	Development of language competences in academic and technical contexts, with emphasis on working with foreign language sources. Improving reading comprehension, writing and oral communication in situations typical for studies and engineering work. Expanding specialist vocabulary and practising language structures used to describe processes, technologies and outcomes. Working with short practical forms (e.g., summaries, e-mails, task descriptions) and elements of presentations. Building accuracy, fluency and appropriate register in communication							x			

No.	Course name	Program content	1ITC1	1ITC2	1ITC3	1ITC4	1ITC5	1ITC6	1ITC7	1ITC8	1ITC9	1ITC10
33	French B2 block I	Development of language competences in academic and technical contexts, with emphasis on working with foreign language sources. Improving reading comprehension, writing and oral communication in situations typical for studies and engineering work. Expanding specialist vocabulary and practising language structures used to describe processes, technologies and outcomes. Working with short practical forms (e.g., summaries, e-mails, task descriptions) and elements of presentations. Building accuracy, fluency and appropriate register in communication.							x			
34	Italian A1 block I	Development of language competences in academic and technical contexts, with emphasis on working with foreign-language sources. Improving reading comprehension, writing and oral communication in situations typical for studies and engineering work. Expanding specialist vocabulary and practising language structures used to describe processes, technologies and outcomes. Working with short practical forms (e.g., summaries, e-mails, task descriptions) and elements of presentations. Building accuracy, fluency and appropriate register in communication.							x			
35	Italian A2 block I	Development of language competences in academic and technical contexts, with emphasis on working with foreign-language sources. Improving reading comprehension, writing and oral communication in situations typical for studies and engineering work. Expanding specialist vocabulary and practising language structures used to describe processes, technologies and outcomes. Working with short practical forms (e.g., summaries, e-mails, task descriptions) and elements of presentations. Building accuracy, fluency and appropriate register in communication.							x			
36	Polish A1 block II	Development of language competences for technical and professional communication. Writing technical texts, solution descriptions and reports, as well as workplace correspondence. Oral communication in professional situations: meetings, short talks, discussions and justification of decisions. Expanding specialist terminology and working with technical documentation and instructions. Building accuracy, precision and an appropriate register in a foreign language.							x			
37	Polish A2 block II	Development of language competences for technical and professional communication. Writing technical texts, solution descriptions and reports, as well as workplace correspondence. Oral communication in professional situations: meetings, short talks, discussions and justification of decisions. Expanding specialist terminology and working with technical documentation and instructions. Building accuracy, precision and an appropriate register in a foreign language.							x			
38	German A1 block I	Development of language competences in academic and technical contexts, with emphasis on working with foreign-language sources. Improving reading comprehension, writing and oral communication in situations typical for studies and engineering work. Expanding specialist vocabulary and practising language structures used to describe processes, technologies and outcomes. Working with short practical forms (e.g., summaries, e-mails, task descriptions) and elements of presentations. Building accuracy, fluency and appropriate register in communication.							x			
39	Spanish A1 block I	Development of language competences in academic and technical contexts, with emphasis on working with foreign-language sources. Improving reading comprehension, writing and oral communication in situations typical for studies and engineering work. Expanding specialist vocabulary and practising language structures used to describe processes, technologies and outcomes. Working with short practical forms (e.g., summaries, e-mails, task descriptions) and elements of presentations. Building accuracy, fluency and appropriate register in communication.							x			

No.	Course name	Program content	1ITC1	1ITC2	1ITC3	1ITC4	1ITC5	1ITC6	1ITC7	1ITC8	1ITC9	1ITC10
40	French A1 block I	Development of language competences in academic and technical contexts, with emphasis on working with foreign-language sources. Improving reading comprehension, writing and oral communication in situations typical for studies and engineering work. Expanding specialist vocabulary and practising language structures used to describe processes, technologies and outcomes. Working with short practical forms (e.g., summaries, e-mails, task descriptions) and elements of presentations. Building accuracy, fluency and appropriate register in communication.							x			
41	Civic Knowledge and Engagement II	Development of language competences in academic and technical contexts, with emphasis on working with foreign-language sources. Improving reading comprehension, writing and oral communication in situations typical for studies and engineering work. Expanding specialist vocabulary and practising language structures used to describe processes, technologies and outcomes. Working with short practical forms (e.g., summaries, e-mails, task descriptions) and elements of presentations. Building accuracy, fluency and appropriate register in communication.		x						x		
42	Embedded Systems and Internet of Things	Programming embedded systems and designing Internet of Things solutions from an engineering perspective. Hardware architectures, resource constraints and interaction with sensors and actuators. Communication and device integration in distributed systems and basics of edge and cloud data processing. Designing IoT solutions with attention to reliability, security and privacy. Laboratory tasks involving implementation, testing and analysis of prototype behaviour.				x						
43	Computer Graphics	Fundamentals of computer graphics from algorithmic and geometric perspectives. Object representation, transformations, projection and rasterisation as elements of the graphics pipeline. Image modelling, basic shading techniques and processing of visual information. Analysis of trade-offs between quality and performance in graphics generation. Implementation of selected algorithms and exercises developing skills in geometry and image processing.		x	x							
44	Introduction to Software Engineering	Software engineering principles in the context of the software system lifecycle. Requirements analysis and specification, architecture design, and planning implementation and testing. Software process models and selecting practices depending on project scale and risks. Solution documentation, change management and communication in project teams. Fundamentals of quality assurance and software maintenance from a product evolution perspective.	x		x							
45	Introduction to Artificial Intelligence	Fundamental concepts and methods of artificial intelligence and typical application areas in computer science. Search and reasoning algorithms, problem representation and the role of heuristics in solving tasks. Introduction to machine learning as a data-driven approach and the relationships between data, models and evaluation. Analysis of capabilities and limitations of AI systems, including risks of incorrect conclusions and generalization issues. Reference to responsible AI use, including transparency and ethics.	x					x				
46	Data Science Fundamentals	Fundamental stages of the data science process: acquisition, preparation, exploration, modelling and result interpretation. Data processing, handling missing values and anomalies, and selecting representations for analysis. Introduction to statistical methods and machine learning used in predictive and descriptive tasks. Evaluation of results with metrics, validation and data limitations taken into account. Building skills in communicating analytical conclusions and documenting data workflows.					x					

No.	Course name	Program content	1ITC1	1ITC2	1ITC3	1ITC4	1ITC5	1ITC6	1ITC7	1ITC8	1ITC9	1ITC10
47	Team Project	Team-based implementation of a technical project integrating knowledge and skills acquired earlier in the programme. Defining objectives, scope and success criteria and planning work iteratively. Designing and implementing a solution with attention to quality, testing and documentation. Team organization: role allocation, communication, progress control and problem solving. Presenting outcomes and critically assessing design decisions and solution limitations.	x						x		x	
48	German A2 block II	Development of language competences for technical and professional communication. Writing technical texts, solution descriptions and reports, as well as workplace correspondence. Oral communication in professional situations: meetings, short talks, discussions and justification of decisions. Expanding specialist terminology and working with technical documentation and instructions. Building accuracy, precision and an appropriate register in a foreign language.							x			
49	German B1 block II	Development of language competences for technical and professional communication. Writing technical texts, solution descriptions and reports, as well as workplace correspondence. Oral communication in professional situations: meetings, short talks, discussions and justification of decisions. Expanding specialist terminology and working with technical documentation and instructions. Building accuracy, precision and an appropriate register in a foreign language.							x			
50	German B2 block II	Development of language competences for technical and professional communication. Writing technical texts, solution descriptions and reports, as well as workplace correspondence. Oral communication in professional situations: meetings, short talks, discussions and justification of decisions. Expanding specialist terminology and working with technical documentation and instructions. Building accuracy, precision and an appropriate register in a foreign language.							x			
51	Spanish A2 block II	Development of language competences for technical and professional communication. Writing technical texts, solution descriptions and reports, as well as workplace correspondence. Oral communication in professional situations: meetings, short talks, discussions and justification of decisions. Expanding specialist terminology and working with technical documentation and instructions. Building accuracy, precision and an appropriate register in a foreign language.							x			
52	Spanish B1 block II	Development of language competences for technical and professional communication. Writing technical texts, solution descriptions and reports, as well as workplace correspondence. Oral communication in professional situations: meetings, short talks, discussions and justification of decisions. Expanding specialist terminology and working with technical documentation and instructions. Building accuracy, precision and an appropriate register in a foreign language.							x			
53	Spanish B2 block II	Development of language competences for technical and professional communication. Writing technical texts, solution descriptions and reports, as well as workplace correspondence. Oral communication in professional situations: meetings, short talks, discussions and justification of decisions. Expanding specialist terminology and working with technical documentation and instructions. Building accuracy, precision and an appropriate register in a foreign language.							x			
54	French A2 block II	Development of language competences for technical and professional communication. Writing technical texts, solution descriptions and reports, as well as workplace correspondence. Oral communication in professional situations: meetings, short talks, discussions and justification of decisions. Expanding specialist terminology and working with technical documentation and instructions. Building accuracy, precision and an appropriate register in a foreign language.							x			

No.	Course name	Program content	1ITC1	1ITC2	1ITC3	1ITC4	1ITC5	1ITC6	1ITC7	1ITC8	1ITC9	1ITC10
55	French B1 block II	Development of language competences for technical and professional communication. Writing technical texts, solution descriptions and reports, as well as workplace correspondence. Oral communication in professional situations: meetings, short talks, discussions and justification of decisions. Expanding specialist terminology and working with technical documentation and instructions. Building accuracy, precision and an appropriate register in a foreign language.							x			
56	French B2 block II	Development of language competences for technical and professional communication. Writing technical texts, solution descriptions and reports, as well as workplace correspondence. Oral communication in professional situations: meetings, short talks, discussions and justification of decisions. Expanding specialist terminology and working with technical documentation and instructions. Building accuracy, precision and an appropriate register in a foreign language.							x			
57	Italian A1 block II	Development of language competences for technical and professional communication. Writing technical texts, solution descriptions and reports, as well as workplace correspondence. Oral communication in professional situations: meetings, short talks, discussions and justification of decisions. Expanding specialist terminology and working with technical documentation and instructions. Building accuracy, precision and an appropriate register in a foreign language.							x			
58	Italian A2 block II	Development of language competences for technical and professional communication. Writing technical texts, solution descriptions and reports, as well as workplace correspondence. Oral communication in professional situations: meetings, short talks, discussions and justification of decisions. Expanding specialist terminology and working with technical documentation and instructions. Building accuracy, precision and an appropriate register in a foreign language.							x			
59	German A1 block II	Development of language competences for technical and professional communication. Writing technical texts, solution descriptions and reports, as well as workplace correspondence. Oral communication in professional situations: meetings, short talks, discussions and justification of decisions. Expanding specialist terminology and working with technical documentation and instructions. Building accuracy, precision and an appropriate register in a foreign language.							x			
60	Spanish A1 block II	Development of language competences for technical and professional communication. Writing technical texts, solution descriptions and reports, as well as workplace correspondence. Oral communication in professional situations: meetings, short talks, discussions and justification of decisions. Expanding specialist terminology and working with technical documentation and instructions. Building accuracy, precision and an appropriate register in a foreign language.							x			
61	French A1 block II	Development of language competences for technical and professional communication. Writing technical texts, solution descriptions and reports, as well as workplace correspondence. Oral communication in professional situations: meetings, short talks, discussions and justification of decisions. Expanding specialist terminology and working with technical documentation and instructions. Building accuracy, precision and an appropriate register in a foreign language.							x			
62	Civic Knowledge and Engagement III	Analysis of advanced social and civic issues related to technological development. Contemporary challenges: automation and AI, information security, disinformation, inequalities and exclusion. Critical assessment of technology's impact on social relations, labour markets and public institutions. Discussion of engineers' responsibility, digital governance and ethical standards in professional practice. Developing argumentation skills and the ability to participate in debates on public interest and sustainability.	x							x		

No.	Course name	Program content	1ITC1	1ITC2	1ITC3	1ITC4	1ITC5	1ITC6	1ITC7	1ITC8	1ITC9	1ITC10
63	Fundamentals of Artificial Intelligence	Systemic and algorithmic models and methods of artificial intelligence. Knowledge representation, state-space search, symbolic reasoning and basic machine learning techniques. Analysis of intelligent system architectures and relationships between data, rules and decision mechanisms.	x			x						
64	Machine Learning	Supervised and unsupervised learning methods for classification, regression and clustering tasks. Data preparation, feature selection and model choice depending on problem characteristics. Validation procedures, performance metrics and analysis of overfitting and generalisation. Interpretation of model results and assessment of robustness under varying data conditions. Implementation and testing of selected algorithms in a programming environment.					x					
65	Introduction to Deep Learning	Fundamentals of neural network architectures and deep models. Learning mechanisms, backpropagation and issues of stability and overfitting. Analysis of applications in image, text and signal processing. Comparison of models in terms of feature representation. Working with example models and interpreting learning results.					x					
66	Data and Knowledge Acquisition	Data sources, methods of acquisition and integration of information from different systems. Data quality assessment, identification of inconsistencies and cleaning processes. Knowledge extraction techniques and transformation of data into analytically useful forms. Analysis of acquisition processes in IT systems and their impact on model quality. Development of critical evaluation skills regarding information reliability.				x						
67	Capstone Module	An integrative engineering project requiring application of knowledge and skills from key programme areas. Analysing and defining a complex problem, including requirements, constraints and evaluation criteria. Designing and implementing a solution with a verification, testing and quality assessment plan. Project management: schedule, role allocation, risks, communication and progress reporting. Presenting outcomes and preparing for the final thesis by structuring documentation and project conclusions.			x				x		x	
68	Introduction to Deep Learning	Fundamentals of neural network architectures and deep models. Learning mechanisms, backpropagation and issues of stability and overfitting. Analysis of applications in image, text and signal processing. Comparison of models in terms of feature representation. Working with example models and interpreting learning results.					x					
69	Data and Knowledge Acquisition	Data sources, methods of acquisition and integration of information from different systems. Data quality assessment, identification of inconsistencies and cleaning processes. Knowledge extraction techniques and transformation of data into analytically useful forms. Analysis of acquisition processes in IT systems and their impact on model quality. Development of critical evaluation skills regarding information reliability.				x						
70	Security in Modern Software	Threats and vulnerabilities in modern application architectures. Secure design patterns and risk mitigation principles in software development. Analysis of application vulnerabilities and authentication and authorisation mechanisms. Integration of security into testing and maintenance processes. Development of awareness in designing resilient systems.		x						x		
71	Modern Software Development Environments	Tools and environments supporting collaborative software development processes. Version control systems, build and deployment automation and continuous integration. Repository organisation, dependency management and code reviews. Analysis of workflows and DevOps practices in terms of quality and efficiency. Practical tasks using contemporary engineering tools.				x						x

No.	Course name	Program content	1ITC1	1ITC2	1ITC3	1ITC4	1ITC5	1ITC6	1ITC7	1ITC8	1ITC9	1ITC10
72	Cybersecurity Fundamentals	Fundamental cyber threats and information protection models. Technical and organisational security mechanisms and basics of risk management. Analysis of security incidents and their organisational consequences. Introduction to security policies and data protection standards. Building awareness of threats and responsible use of IT systems.		x				x		x		
73	Fundamentals of Network Applications	Architecture of network applications and communication models including client-server and peer-to-peer approaches. Application-layer communication protocols and mechanisms of data exchange in computer networks. Programming of applications using network communicationFundamental security aspects of network applications.						x		x		
74	Applied Data Science	Execution of analytical projects covering the full data workflow. Data preparation, modelling and validation in real-world problem contexts. Case study analysis and interpretation of results from business or technical perspectives. Documentation of analytical processes and communication of conclusions. Team-based project work.					x					
75	Visualization and Data Reporting	Principles of designing clear and reliable data visualisations. Selection of graphical forms appropriate to information type and audience. Analysis of visual communication effectiveness and identification of interpretative errors. Integration of visualisations with analytical narrative and reporting. Creation of coherent reports presenting analysis processes and outcomes.					x		x			
76	Physically Based Rendering	Physically based lighting and material models in computer graphics. Light transport, rendering equation and global illumination methods. Analysis of trade-offs between realism and computational cost. Implementation of selected photorealistic rendering techniques. Evaluation of visual quality and algorithm stability.	x		x							
77	Real-Time Rendering Techniques	Real-time graphics generation techniques in interactive applications. Rasterisation, programmable shading and performance optimisation. Analysis of hardware constraints and the impact of GPU architecture on algorithm design. Resource management and balancing image quality with rendering time. Implementation of selected techniques in a programming environment.	x		x							
78	Mobility Semester											
79	IT Entrepreneurship	Fundamentals of entrepreneurship and innovation in the IT sector from a techno-business perspective. Business models for digital products and services and assessing value propositions and market needs. Legal and organizational issues: business forms, intellectual property, contracts and liability. Planning technological ventures: resources, costs, risks, scaling and basics of product management. Case study analysis and development of entrepreneurial attitudes, including critical evaluation of business decisions.								x		x
80	Diploma Seminar	Preparation for the diploma thesis: refining objectives, scope and methodology and planning the work schedule. Analysis and critical evaluation of sources and principles of structuring the thesis and technical documentation. Systematic progress reporting, interim presentations and discussion of results within the seminar group. Developing skills in argumentation, drawing conclusions and presenting outcomes in an organized way. Verification of programme competences through assessment of progress and readiness for defence.							x			x

No.	Course name	Program content	1ITC1	1ITC2	1ITC3	1ITC4	1ITC5	1ITC6	1ITC7	1ITC8	1ITC9	1ITC10
81	Internship	Completion of an industrial placement in a professional environment aligned with the programme profile. Performing project and/or implementation tasks and participating in team processes typical for an organization. Understanding how an enterprise operates: roles, responsibilities, communication, information flow and quality standards. Applying academic knowledge to practical problem solving and reflecting on competences required in professional work. Preparing a summary of the placement and development-oriented conclusions.						x		x		
82	Diploma Thesis	Analysis of the current state of knowledge and existing solutions related to the thesis topic. Development of the solution concept, definition of objectives, scope and design assumptions. Design and implementation of an original computer program constituting a practical solution to the formulated engineering problem. Verification and evaluation of the implemented solution, including testing and analysis of obtained results. Preparation of a complete diploma thesis comprising analytical, design and implementation components.	x		x							x
83	Applications of Machine Learning	Case study analysis of machine learning applications across various domains. Selection of methods appropriate to specific problem characteristics and evaluation of their effectiveness. Integration of ML models with IT systems. Interpretation of results in practical and decision-making contexts. Implementation of application-oriented projects using selected techniques.					x					
84	Quality in Software Development Process	Software quality standards and metrics across the system lifecycle. Testing, code reviews and quality assurance techniques. Analysis of improvement processes and defect management. Evaluation of how quality practices influence system stability and maintainability. Development of a quality-oriented culture in project teams.			x	x						
85	Open Source Intelligence Techniques	Open source information gathering techniques in cybersecurity contexts. Analysis of public data and assessment of its credibility. Integration of information from multiple sources and construction of threat profiles. Identification of risks related to misinformation and incomplete data. Introduction to tools supporting OSINT analysis.					x			x		
86	Big Data Storytelling and Scalable Analytics	Scalable data processing in high-volume and heterogeneous data environments. Analysis of distributed processing architectures and trade-offs between performance and accuracy. Combining analytics with data storytelling for effective communication. Interpretation of complex relationships and presentation of findings in an accessible form. Designing analytical processes that consider data scale and dynamics.					x					
87	Artificial Intelligence in Computer Graphics	Integration of machine learning methods with computer graphics techniques. Image generation, reconstruction and processing using AI models. Analysis of neural network applications in graphics and animation synthesis. Evaluation of quality and reliability of generated outputs. Introduction to trends combining rendering and data-driven approaches.			x		x					
88	Requirements Engineering in IT Projects	Identification, analysis and specification of functional and non-functional requirements in IT projects. Techniques for eliciting requirements from stakeholders and modelling them in a clear and verifiable manner. Managing requirement changes and analysing conflicts between stakeholder expectations. Requirements traceability throughout the project lifecycle and assessment of their impact on system architecture.			x				x			
89	Metaheuristics and Applications	Metaheuristic approaches to solving complex optimisation problems. Analysis of solution spaces. Evaluation of solution quality and efficiency depending on problem characteristics. Implementation and experimental analysis of selected methods.	x					x				

No.	Course name	Program content	1ITC1	1ITC2	1ITC3	1ITC4	1ITC5	1ITC6	1ITC7	1ITC8	1ITC9	1ITC10
90	Security in Modern Software	Threats and vulnerabilities in modern application architectures. Secure design patterns and risk mitigation principles in software development. Analysis of application vulnerabilities and authentication and authorisation mechanisms. Integration of security into testing and maintenance processes. Development of awareness in designing resilient systems.		x						x		
91	Modern Software Development Environments	Tools and environments supporting collaborative software development processes. Version control systems, build and deployment automation and continuous integration. Repository organisation, dependency management and code reviews. Analysis of workflows and DevOps practices in terms of quality and efficiency. Practical tasks using contemporary engineering tools.				x						x

ECTS - subjects

No.	Course name	ECTS	Subjects in the field of humanities and social sciences	Elective subjects	Profile items	Classes in a foreign language
1	Artificial Intelligence Tools for Academic Work	4			4	4
2	Algorithms and Programming Fundamentals	6			6	6
3	Script Programming	4			4	4
4	Physics	3				3
5	Engineering Drawing	2				2
6	Mathematics 1	7			7	7
7	Study Skills for University	1	1			1
8	C1 Business Communication for Engineers 1	3		3		3
9	C2 Business Communication for Engineers 1	3		3		3
10	Object Oriented Programming	6			6	6
11	Electronics Foundation	4				4
12	Operating Systems	4			4	4
13	Computer Aided Design	3				3
14	Modern Physics	3				3
15	Mathematics 2	7			7	7
16	C1 Business Communication for Engineers 2	2		2		2
17	C2 Business Communication for Engineers 2	2		2		2
18	Civic Knowledge and Engagement I	1	1			1
19	Component Programming	5			5	5
20	Network Security	4			4	4
21	Computer Architecture and GPU Programming	4			4	4

No.	Course name	ECTS	Subjects in the field of humanities and social sciences	Elective subjects	Profile items	Classes in a foreign language
22	Mathematics for Applied Computer Science	4			4	4
23	Database Design and Programming	4			4	4
24	Interdisciplinary Problem-Based Learning Project	5			5	5
25	German A2 block I	3		3		3
26	German B1 block I	3		3		3
27	German B2 block I	3		3		3
28	Spanish A2 block I	3		3		3
29	Spanish B1 block I	3		3		3
30	Spanish B2 block I	3		3		3
31	French A2 block I	3		3		3
32	French B1 block I	3		3		3
33	French B2 block I	3		3		3
34	Italian A1 block I	3		3		3
35	Italian A2 block I	3		3		3
36	Polish A1 block II	6		6		6
37	Polish A2 block II	6		6		6
38	German A1 block I	3		3		3
39	Spanish A1 block I	3		3		3
40	French A1 block I	3		3		3
41	Civic Knowledge and Engagement II	1	1			1
42	Embedded Systems and Internet of Things	4			4	4
43	Computer Graphics	4			4	4

No.	Course name	ECTS	Subjects in the field of humanities and social sciences	Elective subjects	Profile items	Classes in a foreign language
44	Introduction to Software Engineering	4			4	4
45	Introduction to Artificial Intelligence	4			4	4
46	Data Science Fundamentals	4			4	4
47	Team Project	6		6	6	6
48	German A2 block II	3		3		3
49	German B1 block II	3		3		3
50	German B2 block II	3		3		3
51	Spanish A2 block II	3		3		3
52	Spanish B1 block II	3		3		3
53	Spanish B2 block II	3		3		3
54	French A2 block II	3		3		3
55	French B1 block II	3		3		3
56	French B2 block II	3		3		3
57	Italian A1 block II	3		3		3
58	Italian A2 block II	3		3		3
59	German A1 block II	3		3		3
60	Spanish A1 block II	3		3		3
61	French A1 block II	3		3		3
62	Civic Knowledge and Engagement III	1	1			1
63	Fundamentals of Artificial Intelligence	5		5	5	5
64	Machine Learning	5		5	5	5
65	Introduction to Deep Learning	3		3	3	3

No.	Course name	ECTS	Subjects in the field of humanities and social sciences	Elective subjects	Profile items	Classes in a foreign language
66	Data and Knowledge Acquisition	3		3	3	3
67	Capstone Module	8		8	8	8
68	Introduction to Deep Learning	3			3	3
69	Data and Knowledge Acquisition	3			3	3
70	Security in Modern Software	3			3	3
71	Modern Software Development Environments	3			3	3
72	Cybersecurity Fundamentals	3			3	3
73	Fundamentals of Network Applications	3			3	3
74	Applied Data Science	3			3	3
75	Visualization and Data Reporting	3			3	3
76	Physically Based Rendering	3			3	3
77	Real-Time Rendering Techniques	3			3	3
78	Mobility Semester	30		30		30
79	IT Entrepreneurship	3	3			3
80	Diploma Seminar	3				3
81	Internship	6				6
82	Diploma Thesis	15		15	15	15
83	Applications of Machine Learning	3			3	3
84	Quality in Software Development Process	3			3	3
85	Open Source Intelligence Techniques	3			3	3
86	Big Data Storytelling and Scalable Analytics	3			3	3
87	Artificial Intelligence in Computer Graphics	3			3	3

No.	Course name	ECTS	Subjects in the field of humanities and social sciences	Elective subjects	Profile items	Classes in a foreign language
88	Requirements Engineering in IT Projects	5		5	5	5
89	Metaheuristics and Applications	5		5	5	5
90	Security in Modern Software	3		3	3	3
91	Modern Software Development Environments	3		3	3	3

ECTS indicators

Name	Diploma Path: Artificial Intelligence	Diploma Path: Software Engineering
The total number of ECTS credits that a student must obtain through elective courses (amounting to no less than 30% of the total ECTS credits required to obtain the qualification corresponding to the given level of study)	95/210 (45.24%)	95/210 (45.24%)
The total number of ECTS credits to be earned by a student through courses in the fields of humanities or social sciences	7	7
The total number of ECTS credits that a student must obtain from courses related to research conducted at the university, amounting to more than 50% of the total ECTS credits required to graduate from a given level of study	138/210 (65.71%)	138/210 (65.71%)

Methods of verifying and assessing learning outcomes

The verification and assessment of learning outcomes in the Information Technology program are conducted systematically and through a variety of methods, appropriate to the expected outcomes in the areas of knowledge, skills, and social competencies. The process is consistent with applicable legal regulations, the Polish Qualifications Framework (PKA) at level 6, and the internal regulations of Lodz University of Technology.

Learning outcomes are verified primarily within individual courses, in accordance with the information provided in course syllabi. The assessment methods are selected based on the nature of the course content and the expected learning outcomes. They include written and oral examinations, tests, individual and team projects, laboratory and programming assignments, technical reports, as well as project documentation and presentations

Social competences are verified through direct and indirect methods, including observations of students' work in project teams and assessments of their engagement, responsibility, reliability, communication skills, cooperation, and compliance with ethical and safety principles. Self-assessment and reflective evaluation may also support the development of students' awareness of their own competencies.

Learning outcomes assigned to the internship are assessed based on tasks performed in a professional environment, internship documentation, the workplace supervisor's opinion, and the academic internship supervisor's evaluation.

At the final stage of the study cycle, learning outcomes are verified through the diploma seminar and diploma thesis. This includes a systematic assessment of the thesis's progress, formal and substantive evaluation by the supervisor and reviewer, and verification of the student's ability to independently solve complex engineering problems, analyze and synthesize information, and present the results of their work.

The final verification of aggregated program learning outcomes occurs through the competency examination, which assesses achievement of program learning outcomes in line with the Polish Qualifications Framework (PKA), and through the diploma examination, including the presentation and the defense of the diploma thesis.

Assessment is conducted in accordance with the grading scale and assessment rules applicable at Lodz University of Technology and specified in the Study Regulations. Detailed assessment criteria, the weighting of individual assessment components, and the method for determining the final grade are defined in the course syllabi.

Professional internships

The internship is an integral part of the first-cycle Information Technology study program. Its purpose is to enable students to apply theoretical knowledge and develop practical skills and social competencies in a real professional environment.

The internship is compulsory for all students and lasts at least 6 weeks, corresponding to 240 hours. Upon successful completion of the internship, the student receives 6 ECTS credits.

The internship may be completed in IT companies, technology enterprises, research and development institutions, public administration units, or other organizations that use, design, implement, or maintain information technologies. It may be carried out both in Poland and abroad, including within academic mobility programs.

The main objectives of the internship are to provide students with professional experience related to the field of study, develop their ability to solve real engineering problems, familiarise them with organizational procedures, teamwork, and professional responsibility, and strengthen their communication, organizational, and ethical competencies. The tasks performed during the internship should support the achievement of program learning outcomes, particularly in practical skills and social competencies.

The internship is completed based on the required duration and scope of work, performance of tasks consistent with the study profile, submission of the required documentation, including the final report, a positive opinion from the workplace supervisor, and a positive assessment by the academic internship supervisor.

Professional internship is credited in accordance with the Study Regulations of Lodz University of Technology and the University's internal rules concerning the organization and completion of internships.

Specializations/degree paths offered within the study program

Diploma Path: Artificial Intelligence

Diploma Path: Software Engineering

Characteristics of the course

Graduate profile

A graduate of the Information Technology program has theoretical foundations and practical competencies in the design, implementation, integration, and maintenance of IT systems. The graduate has analytical skills, can solve complex engineering problems, work with data, use modern IT tools, and communicate effectively in an international environment. The graduate is prepared for responsible professional practice and for further development of competencies in the dynamic field of information technology.

The relationship between the field of study and the university's strategy

The study program is consistent with the strategy of Lodz University of Technology in terms of developing a modern, internationalized educational offer, educating highly qualified engineers, and strengthening links with the socio-economic environment. The program supports the development of digital competencies, innovation, and knowledge transfer to an economy based on data and information technologies.

Educational objectives and employment and continuing education opportunities

The objective of the program is to prepare graduates to:

- solve complex engineering problems in the field of IT,
- design and implement information systems,
- work effectively in teams and act responsibly in their professional roles,
- engage in lifelong learning and adapt to technological change.

Graduates may find employment as software developers, IT systems engineers, data analysts, security specialists, or system administrators. They may also continue their education in second-cycle studies or postgraduate programs.

Description of the process and outcome of consultations on the proposed study program with the socio-economic environment

The study program was developed with input from external stakeholders, including representatives of the IT industry, graduates, and employers. The consultations addressed the program structure, the scope of practical competencies, the importance of security, project-based work, and preparation for the realities of the labor market. Stakeholder comments were used to design the learning outcomes and select courses.

Description of competencies expected from a candidate applying for admission to studies

The admission requirements and detailed admission criteria are specified in the current recruitment rules available at: <https://rekrutacja.p.lodz.pl>

The program also provides for the possibility of confirming learning outcomes in accordance with the applicable resolutions of the Senate and orders of the Rector of Lodz University of Technology.

The unit organizing education

Faculty of Technical Physics, Information Technology and Applied Mathematics/CKM

Education program

Semester 1

Course	Number of hours	ECTS points	Form of verification	Obligatory
Artificial Intelligence Tools for Academic Work	Tutorials: 30 E-learning: 15	4	Graded assignment	Obligatory
Algorithms and Programming Fundamentals	Laboratory classes: 30 Lecture: 30	6	Exam	Obligatory
Script Programming	Laboratory classes: 30 Lecture: 15	4	Graded assignment	Obligatory
Physics	Tutorials: 15 Lecture: 30	3	Graded assignment	Obligatory
Engineering Drawing	Tutorials: 20 Lecture: 10	2	Graded assignment	Obligatory
Mathematics 1	Tutorials: 60 Lecture: 30	7	Exam	Obligatory
Study Skills for University	Seminar: 30	1	Graded assignment	Obligatory
Business Communication for Engineers 1		3	Graded assignment	Obligatory group
The student chooses one module from the group.				
C1 Business Communication for Engineers 1	Tutorials: 60	3	Graded assignment	Optional
C2 Business Communication for Engineers 1	Tutorials: 60	3	Graded assignment	Optional
Sum	405	30		

Semester 2

Course	Number of hours	ECTS points	Form of verification	Obligatory
Object Oriented Programming	Laboratory classes: 30 Lecture: 30	6	Graded assignment	Obligatory
Electronics Foundation	Laboratory classes: 30 Lecture: 15	4	Graded assignment	Obligatory
Operating Systems	Laboratory classes: 30 Lecture: 15	4	Graded assignment	Obligatory
Computer Aided Design	Laboratory classes: 45	3	Graded assignment	Obligatory
Modern Physics	Laboratory classes: 20 Lecture: 20	3	Graded assignment	Obligatory
Mathematics 2	Tutorials: 60 Lecture: 30	7	Exam	Obligatory
Business Communication for Engineers 2		2	Exam	Obligatory group
The student chooses one module from the group.				
C1 Business Communication for Engineers 2	Tutorials: 30	2	Exam	Optional
C2 Business Communication for Engineers 2	Tutorials: 30	2	Exam	Optional
Civic Knowledge and Engagement I	Seminar: 3 Lecture: 3	1	Graded assignment	Obligatory
Physical Education 1	Tutorials: 30	0	Pass	Obligatory
Sum	391	30		

Semester 3

Course	Number of hours	ECTS points	Form of verification	Obligatory
Component Programming	Laboratory classes: 30 Lecture: 30	5	Exam	Obligatory
Network Security	Laboratory classes: 30 Lecture: 30	4	Graded assignment	Obligatory

Course	Number of hours	ECTS points	Form of verification	Obligatory
Computer Architecture and GPU Programming	Laboratory classes: 30 Lecture: 30	4	Graded assignment	Obligatory
Mathematics for Applied Computer Science	Tutorials: 15 Laboratory classes: 15 Lecture: 15	4	Graded assignment	Obligatory
Database Design and Programming	Laboratory classes: 30 Lecture: 30	4	Graded assignment	Obligatory
Interdisciplinary Problem-Based Learning Project	Project work: 30	5	Graded assignment	Obligatory
Foreign Language Block I		3	Graded assignment	Obligatory group
The student chooses one module from the group.				
German A2 block I	Tutorials: 60	3	Graded assignment	Optional
German B1 block I	Tutorials: 60	3	Graded assignment	Optional
German B2 block I	Tutorials: 60	3	Graded assignment	Optional
Spanish A2 block I	Tutorials: 60	3	Graded assignment	Optional
Spanish B1 block I	Tutorials: 60	3	Graded assignment	Optional
Spanish B2 block I	Tutorials: 60	3	Graded assignment	Optional
French A2 block I	Tutorials: 60	3	Graded assignment	Optional
French B1 block I	Tutorials: 60	3	Graded assignment	Optional
French B2 block I	Tutorials: 60	3	Graded assignment	Optional
Italian A1 block I	Tutorials: 60	3	Graded assignment	Optional
Italian A2 block I	Tutorials: 60	3	Graded assignment	Optional
Polish A1 block II	Tutorials: 60	3	Graded assignment	Optional
Polish A2 block II	Tutorials: 60	3	Graded assignment	Optional
German A1 block I	Tutorials: 60	3	Graded assignment	Optional
Spanish A1 block I	Tutorials: 60	3	Graded assignment	Optional

Course	Number of hours	ECTS points	Form of verification	Obligatory
French A1 block I	Tutorials: 60	3	Graded assignment	Optional
Civic Knowledge and Engagement II	Seminar: 3 Lecture: 3	1	Graded assignment	Obligatory
Physical Education 2	Tutorials: 30	0	Pass	Obligatory
Sum	411	30		

Semester 4

Course	Number of hours	ECTS points	Form of verification	Obligatory
Embedded Systems and Internet of Things	Project work: 30 Lecture: 30	4	Graded assignment	Obligatory
Computer Graphics	Laboratory classes: 30 Lecture: 30	4	Graded assignment	Obligatory
Introduction to Software Engineering	Project work: 30 Lecture: 30	4	Exam	Obligatory
Introduction to Artificial Intelligence	Laboratory classes: 30 Lecture: 30	4	Exam	Obligatory
Data Science Fundamentals	Project work: 30 Lecture: 15	4	Graded assignment	Obligatory
Team Project	Project work: 40	6	Graded assignment	Obligatory subjects to choose from
Foreign Language Block II		3	Graded assignment	Obligatory group
The student chooses one module from the group.				
German A2 block II	Tutorials: 60	3	Graded assignment	Optional
German B1 block II	Tutorials: 60	3	Graded assignment	Optional
German B2 block II	Tutorials: 60	3	Graded assignment	Optional

Course	Number of hours	ECTS points	Form of verification	Obligatory
Spanish A2 block II	Tutorials: 60	3	Graded assignment	Optional
Spanish B1 block II	Tutorials: 60	3	Graded assignment	Optional
Spanish B2 block II	Tutorials: 60	3	Graded assignment	Optional
French A2 block II	Tutorials: 60	3	Graded assignment	Optional
French B1 block II	Tutorials: 60	3	Graded assignment	Optional
French B2 block II	Tutorials: 60	3	Graded assignment	Optional
Italian A1 block II	Tutorials: 60	3	Graded assignment	Optional
Italian A2 block II	Tutorials: 60	3	Graded assignment	Optional
Polish A1 block II	Tutorials: 60	3	Graded assignment	Optional
Polish A2 block II	Tutorials: 60	3	Graded assignment	Optional
German A1 block II	Tutorials: 60	3	Graded assignment	Optional
Spanish A1 block II	Tutorials: 60	3	Graded assignment	Optional
French A1 block II	Tutorials: 60	3	Graded assignment	Optional
Civic Knowledge and Engagement III	Seminar: 3 Lecture: 3	1	Graded assignment	Obligatory
Physical Education 3	Tutorials: 30	0	Pass	Obligatory
Sum	421	30		

Semester 5

Course	Number of hours	ECTS points	Form of verification	Obligatory
Capstone Module	Project work: 90	8	Graded assignment	Obligatory subjects to choose from
Elective Course Block 5C		6	Graded assignment	Obligatory group

Course	Number of hours	ECTS points	Form of verification	Obligatory
The student chooses one block.				
Elective Block 5C: Artificial Intelligence		6	Graded assignment	Optional
Introduction to Deep Learning	Laboratory classes: 30 Lecture: 15	3	Graded assignment	Obowiązkowe w bloku
Data and Knowledge Acquisition	Project work: 45	3	Graded assignment	Obowiązkowe w bloku
Elective Block 5C: Software Engineering		6	Graded assignment	Optional
Security in Modern Software	Project work: 45	3	Graded assignment	Obowiązkowe w bloku
Modern Software Development Environments	Project work: 30 Lecture: 15	3	Graded assignment	Obowiązkowe w bloku
Elective Block 5C: Cybersecurity		6	Graded assignment	Optional
Cybersecurity Fundamentals	Laboratory classes: 30 Lecture: 15	3	Graded assignment	Obowiązkowe w bloku
Fundamentals of Network Applications	Laboratory classes: 30 Lecture: 15	3	Graded assignment	Obowiązkowe w bloku
Elective Block 5C: Data Science		6	Graded assignment	Optional
Applied Data Science	Project work: 30 Lecture: 15	3	Graded assignment	Obowiązkowe w bloku
Visualization and Data Reporting	Laboratory classes: 30 Lecture: 15	3	Graded assignment	Obowiązkowe w bloku
Elective Block 5C: Computer Graphics		6	Graded assignment	Optional
Physically Based Rendering	Laboratory classes: 30 Lecture: 15	3	Graded assignment	Obowiązkowe w bloku
Real-Time Rendering Techniques	Project work: 30 Lecture: 15	3	Graded assignment	Obowiązkowe w bloku
Sum	180	14		

Diploma Path: Artificial Intelligence

Course	Number of hours	ECTS points	Form of verification	Obligatory
Fundamentals of Artificial Intelligence	Laboratory classes: 30 Lecture: 30	5	Graded assignment	Obligatory specialization courses
Machine Learning	Laboratory classes: 30 Lecture: 30	5	Graded assignment	Obligatory specialization courses
Introduction to Deep Learning	Laboratory classes: 30 Lecture: 15	3	Graded assignment	Obligatory specialization courses
Data and Knowledge Acquisition	Project work: 45	3	Graded assignment	Obligatory specialization courses
Sum	210	16		

Diploma Path: Software Engineering

Course	Number of hours	ECTS points	Form of verification	Obligatory
Requirements Engineering in IT Projects	Project work: 30 Lecture: 30	5	Graded assignment	Obligatory specialization courses
Metaheuristics and Applications	Laboratory classes: 30 Lecture: 30	5	Graded assignment	Obligatory specialization courses
Security in Modern Software	Project work: 45	3	Graded assignment	Obligatory specialization courses
Modern Software Development Environments	Project work: 30 Lecture: 15	3	Graded assignment	Obligatory specialization courses
Sum	210	16		

Semester 6

The student selects courses from a foreign university.

Course	Number of hours	ECTS points	Form of verification	Obligatory
Mobility Semester	Total number of contact hours: 450	30	Graded assignment	Obligatory subjects to choose from
Sum	450	30		

Semester 7

Course	Number of hours	ECTS points	Form of verification	Obligatory
IT Entrepreneurship	Tutorials: 30 Lecture: 15	3	Graded assignment	Obligatory
Diploma Seminar	Seminar: 30	3	Graded assignment + exam	Obligatory
Internship	Internship: 0	6	Pass	Obligatory
Diploma Thesis	Diploma Thesis: 0	15	Pass	Obligatory subjects to choose from
Elective Course Block 7D		3	Graded assignment	Obligatory group
The student chooses one block.				
Elective Block 7D: Artificial Intelligence		3	Graded assignment	Optional
Applications of Machine Learning	Project work: 45	3	Graded assignment	Obowiązkowe w bloku
Elective Block 7D: Software Engineering		3	Graded assignment	Optional
Quality in Software Development Process	Project work: 30 Lecture: 15	3	Graded assignment	Obowiązkowe w bloku

Course	Number of hours	ECTS points	Form of verification	Obligatory
Elective Block 7D: Cybersecurity		3	Graded assignment	Optional
Open Source Intelligence Techniques	Laboratory classes: 30 Lecture: 15	3	Graded assignment	Obowiązkowe w bloku
Elective Block 7D: Data Science		3	Graded assignment	Optional
Big Data Storytelling and Scalable Analytics	Project work: 30 Lecture: 15	3	Graded assignment	Obowiązkowe w bloku
Elective Block 7D: Computer Graphics		3	Graded assignment	Optional
Artificial Intelligence in Computer Graphics	Project work: 45	3	Graded assignment	Obowiązkowe w bloku
Sum	120	30		