Bialystok University of Technology
Faculty of Electrical Engineering

Field of study	**Industry Digitization**							Degree level and programme type	**full-time Bachelor's degree**
Specjalization / diploma path	**common subject**							Study profile	**general academic**
Course name	**Mathematics 1**							Course code	**CP1S01001**
								Course type	**obligatory**
Forms and number of hours of educational ectivities	L	C	LC	P	SW	FW	S	Semester	**1**
	30	**60**						No. of ECTS credits	**7**
Entry requirements	-								
Course objectives	Getting to know the concept of a complex number and performing operations on these numbers. Familiarization with the basics of vector calculus and methods of linear algebra and preparation to use them in solving engineering problems. Ability to analyze properties of functions of one variable. Getting to know the basics of differential and integral calculus of functions of one variable and developing the ability to use them in the further education cycle. Introduction of basic knowledge on series.								
Course content	Lecture: Introduction of the concept of a complex number. Forms of complex numbers and basic operations on them. Basics of matrix calculus. Presentation of methods of solving systems of linear equations. Vector calculus in plane and in space. Function of one variable and its properties. Limit and continuity of functions. Differential and integral calculus of functions of one variable. Presentation of applications of derivatives and integrals in engineering practice. Basic knowledge of numerical, power and trigonometric series. Classes: Developing the ability to perform operations on complex numbers, matrices and vectors. Application of Cramer's equations and Gaussian elimination to solving systems of linear equations. Acquainting with the basic concepts of analytical geometry and methods of describing a straight line and a plane in space. Analysis of properties of functions of one variable. The ability to calculate the limit of a function and test its continuity. Determining the derivative of a function and its application, find extremes and study the course of function variability. Using basic methods of integration to find the quadrature. Definite integrals. The ability to test the convergence of series. Expanding a function into a Fourier trigonometric series.								
Teaching methods	Informative-problem lecture; Classes;								
Assessment method	Lecture: exam Classes: two tests								

Symbol of learning outcome	Learning outcomes	Reference to the learning outcomes for the field of study

	Knowledge: the graduate knows and understands	
LO1	basic operations on complex numbers; basics of vector and matrix calculus	CP1_W01
LO2	basis of differential and integral calculus of functions of one variable	CP1_W01
LO3	selected problems of series theory	CP1_W01
	Skills: the graduate is able to	
LO4	perform operations on complex numbers, vectors and matrices	CP1_U06
LO5	calculate derivatives and integrals and indicate their applications	CP1_U06
LO6	recognize series and find their characteristic parameters	CP1_U06

Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed
LO1	Lecture: exam;	W
LO2	Lecture: exam;	W
LO3	Lecture: exam;	W
LO4	Classes: two tests;	C
LO5	Classes: two tests;	C
LO6	Classes: two tests;	C

Student workload (in hours)		No. of hours
Calculation	Lecture attendance	30
	Classes attendance	60
	Preparation for the lecture exam; participation in the exam	42
	Preparation for classes	26
	Preparation for classes completion	12
	Participation in teacher-student sessions related to the module subject	5
	TOTAL	175

Quantitative indicators	Hours	ECTS
Student workload - activities that require direct teacher participation	97	3,9
Student workload - practical activities	103	4,1

Basic references	1. Jurlewicz T., Skoczylas Z., Algebra i geometria analityczna: definicje, twierdzenia, wzory. GiS, 2020. 2. Jurlewicz T., Skoczylas Z., Algebra i geometria analityczna: przykłady i zadania. GiS, 2020. 3. Gewert M., Skoczylas Z., Analiza Matematyczna 1: definicje, twierdzenia, wzory. GiS, 2020. 4. Gewert M., Skoczylas Z., Analiza Matematyczna 1: przykłady i zadania. GiS, 2020. 5. Decewicz G., Żakowski W., Matematyka, Analiza matematyczna, Część 1. PWN, 2009.
Supplementary references	1. McQuarrie D., Matematyka dla przyrodników i inżynierów, t. 1-3. PWN, 2005. 2. Trajdos T., Matematyka Część 3. PWN, 2018. 3. Mitkowski W., Równania macierzowe i ich zastosowania. AGH, 2012. 4. Krysicki W., Włodarski L., Analiza matematyczna w zadaniach 1. PWN, 2015.

Organisational unit conducting the course	Department of Automatic Control and Robotics	Date of issuing the programme
Author of the programme	dr inż. Kamil Borawski	2022-06-07

Bialystok University of Technology
Faculty of Electrical Engineering

Field of study	**Industry Digitization**							Degree level and programme type	**full-time Bachelor's degree**
Specjalization / diploma path	**common subject**							Study profile	**general academic**
Course name	**Technical drawing**							Course code	**CP1S01002**
								Course type	**obligatory**
Forms and number of hours of educational ectivities	L	C	LC	P	SW	FW	S	Semester	**1**
	15				**45**			No. of ECTS credits	**5**
Entry requirements	-								
Course objectives	Acquiring knowledge in the field of mapping and dimensioning of parts of electrotechnical and electronic devices and preparation of technical documentation of electrical components of the project. Developing the ability to draw electrotechnical and electronic components and devices, as well as their connections and electrical and assembly diagrams. Acquainting with legal acts, standardization and rules of preparing documentation used in electrical engineering and industrial automation. Acquiring the ability to read and make drawings, including the preparation of printouts and technical reports. Acquiring knowledge in the field of mapping and dimensioning of machine parts. Developing the ability to draw machine parts on working drawings, as well as their connections (separate and inseparable) on assembly drawings. Acquainting with the principles of dimensioning, tolerating and shaping the geometrical structure of a surface. Acquiring the ability to read and create schematic drawings of machine assemblies and to make freehand drawings of simple details.								
Course content	Lecture: The course of the design process in the field of electromechanics, electrical engineering and industrial automation. Technical documentation and its role in the investment process. Create views, sections, breaks, and tears. Dimensioning and tolerance of dimensions. Free and tolerated dimensions. Classes of tolerances. Shape and position tolerances. Compound tolerances. Surface condition (roughness, coating identification). Separate and inseparable connections. Working and assembly drawings. Schematic drawings. The method of creating electrical technical documentation. Legal acts and standardization in the field of creating technical documentation for the electrical part of a project. Principles of technical drawing of electrical and electromechanical parts. Types of electrical schematics. Principles of drawing up assembly drawings. Methods of preparing printouts and reports. Perpendicular mapping of spatial elements to one, two and three viewports. Polish standards in engineering graphics. Specialistic workshop:								

	Creating drawing sketches. Mapping electromechanical parts in projections. Creating power supply circuit diagrams. Creation of control circuit diagrams. Creating diagrams of operator panels. Creation of assembly drawings. Designing circuits with PLC controllers. Drawing views and sections. Working drawing of selected machine components (dimensions, tolerances, roughness). Drawing mechanical joints (separable and non-separable). Assembly drawing (views, sections, breakouts, parts specification) and schematic drawing.	
Teaching methods	Informative-problem lecture; Classes in computer methods and techniques with demonstration, instruction and discussion;	
Assessment method	Lecture: exam Specialistic workshop: evaluation of reports, individual progress, discussion and activity at workshop	
Symbol of learning outcome	Learning outcomes	Reference to the learning outcomes for the field of study
	Knowledge: the graduate knows and understands	
LO1	rules of electrical technical drawing (in electrical engineering and industrial automation) as well as rules of mechanical technical drawing (projection and dimensioning of machine parts)	CP1_W03
LO2	methods of engineering graphics for spatial representation of electromechanical and automation components	CP1_W03 CP1_W04
LO3	design methodology of mechanical devices	CP1_W03
	Skills: the graduate is able to	
LO4	develop technical documentation of mechanical, electromechanical and industrial automation systems	CP1_U04 CP1_U01
LO5	map mechanical and electromechanical parts and draw assembly, power and control diagrams using dedicated software	CP1_U06
LO6	work individually and in a team to implement project tasks	CP1_U03
Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed
LO1	Lecture: exam;	W
LO2	Lecture: exam;	W
LO3	Lecture: exam;	W
LO4	Specialistic workshop: evaluation of reports, individual progress, discussion and activity at workshop;	Ps
LO5	Specialistic workshop: evaluation of reports, individual progress, discussion and activity at workshop;	Ps
LO6	Specialistic workshop: evaluation of reports, individual progress, discussion and activity at workshop;	Ps
Student workload (in hours)		No. of hours
	Lecture attendance	15
	Workshop attendance	45

Calculation	Preparation for the lecture exam; participation in the exam	24	
	Preparation for specialistic workshop	28	
	Preparation for workshop completion	8	
	Participation in teacher-student sessions related to the module subject	5	
	TOTAL	125	
Quantitative indicators		Hours	ECTS
Student workload - activities that require direct teacher participation		67	2,7
Student workload - practical activities		86	3,4
Basic references	1. Sapiński T., Michel K., Rysunek techniczny elektryczny, WNT, Warszawa 1987. 2. Michel T., Sapiński K., Czytam rysunek elektryczny. WSiP, Warszawa 1999. 3. Burcan J., Podstawy rysunku technicznego. WNT, Warszawa 2010. 4. Fołęga P., Zasady zapisu konstrukcji części maszyn. Wydawnictwo Politechniki Śląskiej, Gliwice 2011. 5. Dobrzański T., Rysunek techniczny maszynowy. WNT, Warszawa 2015.		
Supplementary references	1. PN-EN 61082-1:2006 (U) Przygotowanie dokumentów używanych w elektrotechnice. 2. Faszczewski M., Kurs czytania schematów elekrycznych, iautomatyka.pl. 3. Simmons C. H., Maguire D. E., Phelps N., Manual of engineering drawing. Newnes, Amsterdam 2009.		
Organisational unit conducting the course	Department of Photonics, Electronics and Light Technology	Date of issuing the programme	
Author of the programme	dr hab. inż. Jacek Żmojda, prof. PB	2022-06-07	

Bialystok University of Technology
Faculty of Electrical Engineering

Field of study	**Industry Digitization**							Degree level and programme type	**full-time Bachelor's degree**
Specjalization / diploma path	**common subject**							Study profile	**general academic**
Course name	**Analog technology and fundamentals of electronics**							Course code	**CP1S01003**
								Course type	**obligatory**
Forms and number of hours of educational ectivities	L	C	LC	P	SW	FW	S	Semester	**1**
	30	**15**	**15**					No. of ECTS credits	**5**
Entry requirements	-								
Course objectives	Learning basic concepts and theorems in the field of analog technology and the basics of electronics. Acquisition of the ability to analyze linear circuits. Experimental verification of acquired knowledge and skills.								
Course content	Lecture: Basic electric quantities and their units. Models of electrical components. Resonant circuits. First order RC passive filters. Static and dynamic parameters, linearity, stationarity. Ideal and real sources, controlled sources. Kirchhoff's laws. Thevenin and Norton theorems. The principle of superposition. The ring current method, the node potential method. Linear circuits with constant and sinusoidal excitation. Voltage-current relationships on RLC elements, the concept of an indicator. Classes: Solving tasks illustrating the content of the lecture. Laboratory classes: Acquiring the ability to use basic measuring equipment (oscilloscope, function generator, laboratory power supply, multimeters). Ohm's law. Kirchhoff's laws. The principle of superposition. Serial and parallel connection of RLC elements. Resonant circuits. First order RC passive filters.								
Teaching methods	Informative-problem lecture; Classes; Laboratory classes;								
Assessment method	Lecture: exam Classes: one test Laboratory: evaluation of introductory tests, reports, discussion and activity during the classes								

Symbol of learning outcome	Learning outcomes	Reference to the learning outcomes for the field of study
	Knowledge: the graduate knows and understands	
LO1	selected methods of electrical/electronic systems analysis	CP1_W04
	Skills: the graduate is able to	
LO4	use known methods to analyze basic analog circuits	CP1_U06
LO5	use basic measuring equipment to carry out experiments verifying the	CP1_U11

LO5	operation of analog systems		
LO6	prepare a report on the performed laboratory exercise, interpret the results and formulate conclusions	CP1_U04 CP1_U01	
Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed	
LO1	Lecture: exam;	W	
LO4	Classes: one test; Laboratory: evaluation of introductory tests, reports, discussion and activity during the classes;	C L	
LO5	Laboratory: evaluation of introductory tests, reports, discussion and activity during the classes;	L	
LO6	Laboratory: evaluation of introductory tests, reports, discussion and activity during the classes;	L	
Student workload (in hours)		No. of hours	
Calculation	Lecture attendance	30	
	Classes attendance	15	
	Laboratory classes attendance	15	
	Preparation for the lecture exam; participation in the exam	23	
	Preparation for classes	14	
	Preparation for classes completion	3	
	Preparation for laboratory classes	17	
	Preparation for laboratory classes completion	3	
	Participation in teacher-student sessions related to the module subject	5	
	TOTAL	125	
Quantitative indicators		Hours	ECTS
Student workload - activities that require direct teacher participation		67	2,7
Student workload - practical activities		72	2,9
Basic references	1. Bolkowski S., Teoria obwodów elektrycznych. WNT, Warszawa 2017. 2. Osiowski J., Szabatin J., Podstawy teorii obwodów, tom 1, WNT, Warszawa 2016. 3. Osiowski J., Szabatin J., Podstawy teorii obwodów, tom 2, WNT, Warszawa 2017. 4. Bolkowski S., Brociek W., Rawa H., Teoria obwodów elektrycznych: zadania. WNT, Warszawa 2017. 5. Makal J. (red.), Zadania z podstaw elektrotechniki. Wyd. PB, Białystok 2006.		
Supplementary references	1. Bolkowski S., Elektrotechnika. WSiP, Warszawa 2010. 2. Tung L. J., Kwan B. W., Circuit Analysis. World Scientific, New Jersey 2001. 3. Wolski W., Teoretyczne podstawy techniki analogowej. Oficyna Wyd. PWr, Wrocław, 2006.		
Organisational unit conducting the course	Department of Automatic Control and Robotics	Date of issuing the programme	
Author of the programme	dr inż. Andrzej Karpiuk	2022-06-07	

Bialystok University of Technology
Faculty of Electrical Engineering

Field of study	**Industry Digitization**							Degree level and programme type	**full-time Bachelor's degree**
Specjalization / diploma path	**common subject**							Study profile	**general academic**
Course name	**Engineering software**							Course code	**CP1S01004**
								Course type	**obligatory**
Forms and number of hours of educational ectivities	L	C	LC	P	SW	FW	S	Semester	**1**
	15				**30**			No. of ECTS credits	**3**
Entry requirements	-								
Course objectives	General characteristics of engineering programs. Familiarization with the use of MATLAB/Simulink software in terms of performing numerical calculations, writing functions and m-files, modeling differential equations, displaying and representing the results of calculations and simulations. Getting to know the ways of writing and reading to text files and using the dedicated MATLAB data format. Implementation of data acquisition and transfer using Virtual COM.								
Course content	Lecture: Presentation of the characteristics and functions of engineering programs. Presentation of the MATLAB help library with an overview of the most important functions. Getting to know the basics of calculations and simulations in the MATLAB/Simulink environment. Description of application and practical use of s-functions, m-files, and methods for graphical visualization in MATLAB environment. Description of motion equations in Simulinek. Symbolic calculations. Specialistic workshop: Introduction to MATLAB package: command window, help package, performing simple calculations. Using m-files to write simple calculations, algorithms. Data structures. Basics of statistics. Basics of image processing and analysis. SIMULINK Suite: creating projects, building and simulating layouts. Implementation of mathematical operations on vectors and matrices. Access to matrix elements. Automatic indexing. Loop (while, for), and conditional statements. Create functions: arguments, return values. Data presentation and visualization, 2D and 3D charts, chart formatting, interactive charts. Exporting charts. Solving linear and nonlinear equations.								
Teaching methods	Informative-problem lecture; Classes in computer methods and techniques with demonstration, instruction and discussion;								
Assessment method	Lecture: one test Specialistic workshop: evaluation of reports, individual progress, discussion and activity at workshop								

Symbol of learning outcome	Learning outcomes	Reference to the learning outcomes for the field of study
	Knowledge: the graduate knows and understands	
LO1	tools, methods and functions for computer simulation	CP1_W01 CP1_W02

LO1	tools, methods and functions for computer simulation	
LO2	computer methods for modeling and solving motion equations described by differential/difference linear/nonlinear equations	CP1_W02 CP1_W03
	Skills: the graduate is able to	
LO4	model objects and systems of industry digitization using MATLAB/Simulink environment	CP1_U06 CP1_U07 CP1_U08 CP1_U11
LO5	create scripts, functions, and read and write data to files using MATLAB environment	CP1_U07 CP1_U08 CP1_U11
LO6	create two- and three-dimensional graphs, save them to files, display images, create simple animations	CP1_U07 CP1_U09 CP1_U11
	Social competences: the graduate is ready to	
LO7	critical assessment of knowledge of computer methods for engineering problems	CP1_K01 CP1_K04

Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed
LO1	Lecture: one test;	W
LO2	Lecture: one test;	W
LO4	Specialistic workshop: evaluation of reports, individual progress, discussion and activity at workshop;	Ps
LO5	Specialistic workshop: evaluation of reports, individual progress, discussion and activity at workshop;	Ps
LO6	Specialistic workshop: evaluation of reports, individual progress, discussion and activity at workshop;	Ps
LO7	Lecture: one test; Specialistic workshop: evaluation of reports, individual progress, discussion and activity at workshop;	W Ps

Student workload (in hours)		No. of hours
Calculation	Lecture attendance	15
	Workshop attendance	30
	Preparation for lecture test(s)	9
	Preparation for specialistic workshop	12
	Preparation for workshop completion	4
	Participation in teacher-student sessions related to the module subject	5
	TOTAL	75

Quantitative indicators	Hours	ECTS
Student workload - activities that require direct teacher participation	50	2
Student workload - practical activities	51	2

Basic references	1. Mrozek B., Mrozek Z., MATLAB i Simulink: poradnik użytkownika, Wydawnictwo Helion, Gliwice, 2004. 2. Łysakowska B., Mzyk G., Komputerowa symulacja układów automatycznej regulacji w środowisku MATLAB/Simulink, Oficyna Wydawnicza Politechniki Wrocławskiej, 2005. 3. Ogata K., Modern Control Engineering, 4th ed., Pearson Education International, 2002.

	4. Łysakowska B., Mzyk G., Komputerowa symulacja układów automatycznej regulacji w środowisku MATLAB/Simulink, Oficyna Wydawnicza Politechniki Wrocławskiej, 2005.	
Supplementary references	1. Tewari A., Modern Control Design: with MATLAB and Simulink, Wiley-IEEE Press, 2001. 2. Hahn B., Valentine D. T., Essential MATLAB for Engineers and Scientists, 3rd ed., Elsevier Science & Technology Books, 2007. 3. Bequette B. W., Process Control, Modeling, Design and Simulation, Prentice Hall, 2003. 4. Webinaria, przewodniki na serwerach: www.ont.com.pl, www.mathworks.com	
Organisational unit conducting the course	Department of Automatic Control and Robotics	Date of issuing the programme
Author of the programme	dr inż. Sławomir Romaniuk	2022-06-07

Bialystok University of Technology
Faculty of Electrical Engineering

Field of study	**Industry Digitization**							Degree level and programme type	**full-time Bachelor's degree**
Specjalization / diploma path	**common subject**							Study profile	**general academic**
Course name	**C programming**							Course code	**CP1S01005**
								Course type	**obligatory**
Forms and number of hours of educational ectivities	L	C	LC	P	SW	FW	S	Semester	**1**
	15				**30**			No. of ECTS credits	**3**
Entry requirements	-								
Course objectives	Acquainting with the basic concepts of structured programming to the extent necessary to understand the principles of creating and functioning of application software. Developing the ability to formulate computer algorithms and their implementation in the form of simple structural programs in a high-level language.								
Course content	Lecture: General structure of the program in C language. Compilation and consolidation of programs. Input-output operations. Pointers, dynamic memory allocation. Functions, general structure of functions, passing arguments to functions, recursion. Variables, declarations, types and names of variables. Numeric constants. Operators and arithmetic expressions, operator precedence, mathematical functions. Relational, logical and bitwise operators. Logical expressions. The conditional if statement, the conditional operator, the switch statement. For, while and do... while loops. One- and multidimensional arrays, character arrays, structures. Specialistic workshop: Support for a selected environment for creating, analyzing and running programs in C language. Creating computer programs in C language with the use of variables, input-output operations, operators and arithmetic expressions, relational operators, logical and bitwise, if statement, switch statement, conditional operator, loops, arrays, structures, pointers, dynamic memory allocation, user functions. Tracing the execution of the program (debugger).								
Teaching methods	Informative-problem lecture; Classes in computer methods and techniques with demonstration, instruction and discussion;								
Assessment method	Lecture: one test Specialistic workshop: evaluation of reports, individual progress, discussion and activity at workshop								

Symbol of learning outcome	Learning outcomes	Reference to the learning outcomes for the field of study
	Knowledge: the graduate knows and understands	
LO1	basic techniques for design and structured programming of simple C language applications	CP1_W07
LO2	basic structures and syntax of the C language	CP1_W07

LO2	basic structures and syntax of the C language	
	Skills: the graduate is able to	
LO4	write a program in C based on assumptions	CP1_U07
LO5	apply appropriate programming techniques to execute the program	CP1_U07
LO6	test the program and detect and neutralize the cause of the program malfunction	CP1_U07
Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed
LO1	Lecture: one test;	W
LO2	Lecture: one test;	W
LO4	Specialistic workshop: evaluation of reports, individual progress, discussion and activity at workshop;	Ps
LO5	Specialistic workshop: evaluation of reports, individual progress, discussion and activity at workshop;	Ps
LO6	Specialistic workshop: evaluation of reports, individual progress, discussion and activity at workshop;	Ps
Student workload (in hours)		No. of hours
Calculation	Lecture attendance	15
	Workshop attendance	30
	Preparation for lecture test(s)	9
	Preparation for specialistic workshop	12
	Preparation for workshop completion	4
	Participation in teacher-student sessions related to the module subject	5
	TOTAL	75
Quantitative indicators		Hours / ECTS
Student workload - activities that require direct teacher participation		50 / 2
Student workload - practical activities		51 / 2
Basic references	1. Prata S., Język C. Szkoła programowania. Helion, Gliwice 2016. 2. Kernighan B. W., Ritchie D. M., The C Programming Language, 2nd edition, Prentice Hall, 1988 (Język ANSI C. WNT, Warszawa 2004; Język ANSI C. Programowanie, Helion, Warszawa 2010). 3. Coldwin G., Zrozumieć programowanie. PWN, Warszawa 2020. 4. Deitel P. J., Deitel H., Język C. Solidna wiedza w praktyce. Wydanie VIII. Helion, Gliwice 2020. 5. Reese R., Wskaźniki w języku C. Przewodnik. Helion, Gliwice 2014.	
Supplementary references	1. Kawa R., Lembas J., Wykłady z informatyki. Wstęp do informatyki. PWN, Warszawa 2021. 2. Aho A., Ullman J. D., Wykłady z informatyki z przykładami w języku C. Helion, Gliwice 2003. 3. Kochan S. G., Język C. Kompendium wiedzy. Helion, Gliwice 2015.	
Organisational unit conducting the course	Department of Electrical Engineering, Energoelectronics and Electroenergetics	Date of issuing the programme
Author of the programme	dr inż. Jarosław Forenc	2022-06-07

Bialystok University of Technology
Faculty of Electrical Engineering

Field of study	**Industry Digitization**							Degree level and programme type	**full-time Bachelor's degree**
Specjalization / diploma path	**common subject**							Study profile	**general academic**
Course name	**Operating systems**							Course code	**CP1S01006**
								Course type	**obligatory**
Forms and number of hours of educational ectivities	L	C	LC	P	SW	FW	S	Semester	**1**
	15				**30**			No. of ECTS credits	**3**
Entry requirements	-								
Course objectives	Learn operating systems based on the Linux kernel. Acquiring of practical skills in the installation, configuration and use of Linux and Android operating systems.								
Course content	Lecture: Definition of free software. Software licenses. Linux system configuration and management. Graphical user interfaces. Selected applications in Linux. Definition and functions of the operating system. Classification of operating systems. Features of the Linux operating system - advantages, disadvantages, areas of application, distribution, installation and software management. Linux shell. Linux commands. Linux shell scripts. File system and device files. System boot. Specialistic workshop: VirtualBox, Linux operating system installation. Bourne Again Shell (bash) - basic commands. Linux shell scripts. Linux root file system. Linux configuration - directory structure, /etc. Logging of system events. User management. Scheduling repetitive tasks in cron. Stream processing, processing automation with make. Linux applications.								
Teaching methods	Informative-problem lecture; Classes in computer methods and techniques with demonstration, instruction and discussion;								
Assessment method	Lecture: one test Specialistic workshop: evaluation of reports, individual progress, discussion and activity at workshop								

Symbol of learning outcome	Learning outcomes	Reference to the learning outcomes for the field of study
	Knowledge: the graduate knows and understands	
LO1	advantages, disadvantages, areas of application and selected distributions of operating systems based on the Linux kernel	CP1_W07
LO2	functions of the operating system and methods of installation, configuration and use of operating systems based on the Linux kernel	CP1_W12
	Skills: the graduate is able to	

LO4	configure and manage a Linux-based system, including creating and using configuration scripts	CP1_U07
LO5	install, configure and use software running under the control of an operating system based on the Linux kernel, in particular use available software to perform tasks related to data processing	CP1_U07 CP1_U10
Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed
LO1	Lecture: one test;	W
LO2	Lecture: one test;	W
LO4	Specialistic workshop: evaluation of reports, individual progress, discussion and activity at workshop;	Ps
LO5	Specialistic workshop: evaluation of reports, individual progress, discussion and activity at workshop;	Ps
Student workload (in hours)		No. of hours
Calculation	Lecture attendance	15
	Workshop attendance	30
	Preparation for lecture test(s)	9
	Preparation for specialistic workshop	12
	Preparation for workshop completion	4
	Participation in teacher-student sessions related to the module subject	5
	TOTAL	75
Quantitative indicators		Hours / ECTS
Student workload - activities that require direct teacher participation		50 / 2
Student workload - practical activities		51 / 2
Basic references	1. Tanenbaum A. S., Systemy Operacyjne. Wydawnictwo Helion, Gliwice 2015. 2. Gagne G., Peter G. B., Silberschatz A., Podstawy systemów operacyjnych. Wydawnictwa Naukowe PWN, Warszawa 2021. 3. Nemeth E., Snyder G., Hein T. R., Whaley B., Mackin D., Unix i Linux. Przewodnik administratora systemów. Helion, Gliwice 2018.	
Supplementary references	1. Dokumentacja systemu Android - http://android.com/. 2. Sosna Ł., Linux. Komendy i polecenia. Helion, Gliwice 2014.	
Organisational unit conducting the course	Department of Photonics, Electronics and Light Technology	Date of issuing the programme
Author of the programme	dr inż. Krzysztof Konopko	2022-06-07

Bialystok University of Technology
Faculty of Electrical Engineering

Field of study	**Industry Digitization**							Degree level and programme type	**full-time Bachelor's degree**
Specjalization / diploma path	**common subject**							Study profile	**general academic**
Course name	**Occupational safety, health and ergonomics**							Course code	**CP1S01007**
								Course type	**obligatory**
Forms and number of hours of educational ectivities	L	C	LC	P	SW	FW	S	Semester	**1**
	15							No. of ECTS credits	**1**
Entry requirements	-								
Course objectives	Getting to know general principles of health and safety at work. Acquainting with selected issues related to fire protection. Acquainting with principles and methods of providing first aid. Getting to know basic principles of ergonomics.								
Course content	Lecture: Current legal acts in the field of occupational health and safety. The influence of external factors on the human body. Review and selection of personal protection measures. Requirements for work premises. Safety signs. Fire protection of facilities: fire prevention, rules of conduct during a fire, methods and means of extinguishing fires. Principles and methods of providing first aid. Basics of ergonomics: human workload, rules of creating workstations. Rules for safe and comfortable work at the computer.								
Teaching methods	Informative-problem lecture;								
Assessment method	Lecture: one test								

Symbol of learning outcome	Learning outcomes	Reference to the learning outcomes for the field of study
	Knowledge: the graduate knows and understands	
LO1	requirements of applicable regulations regarding health and safety at work	CP1_W11
LO2	threats to the human organism from the working environment	CP1_W11
LO3	types of fires and methods of extinguishing them as well as rules and methods of first aid providing	CP1_W11
	Social competences: the graduate is ready to	
LO7	taking actions for the social environment in accordance with principles of occupational health and safety	CP1_K05

Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed

LO1	Lecture: one test;	W	
LO2	Lecture: one test;	W	
LO3	Lecture: one test;	W	
LO7	Lecture: one test;	W	
Student workload (in hours)		No. of hours	
Calculation	Lecture attendance	15	
	Preparation for lecture test(s)	5	
	Participation in teacher-student sessions related to the module subject	5	
	TOTAL	25	
Quantitative indicators		Hours	ECTS
Student workload - activities that require direct teacher participation		20	0,8
Student workload - practical activities		0	0
Basic references	1. Rączkowski B., BHP w praktyce. ODDK, Gdańsk, 2010. 2. Celeda R., Bezpieczeństwo i higiena pracy. ABC a Wolters Kluwer business, Warszawa, 2010. 3. Horst W. M., Horst N., Ergonomia z elementami bezpieczeństwa i ochrony zdrowia w pracy. Wydawnictwo Politechniki Poznańskiej, Poznań, 2011. 4. Augustyńska D., Bezpieczeństwo i higiena pracy. Centralny Instytut Ochrony Pracy - Państwowy Instytut Badawczy, Warszawa, 2008.		
Supplementary references	1. Dołęgowski B., Janczała S., Co pracownik powinien wiedzieć o BHP: podstawowe wiadomości o bezpieczeństwie pracy, zagrożeniach zawodowych, pierwszej pomocy i ochronie przeciwpożarowej. ODDK, Gdańsk, 2010. 2. Fertsch M., Ergonomia, technika i technologia, zarządzanie. Wydawnictwo Politechniki Poznańskiej, Poznań, 2009. 3. Dahlke G., Górny A., The ergonomics and safety in environment of human live. Publishing House of Poznan University of Technology, Poznań, 2009.		
Organisational unit conducting the course	Department of Electrical Engineering, Energoelectronics and Electroenergetics	Date of issuing the programme	
Author of the programme	dr inż. Grzegorz Hołdyński	2022-06-07	

Bialystok University of Technology
Faculty of Electrical Engineering

Field of study	**Industry Digitization**							Degree level and programme type	**full-time Bachelor's degree**
Specjalization / diploma path	**common subject**							Study profile	**general academic**
Course name	**New trends in AEE and ID technologies**							Course code	**CP1S01008**
								Course type	**elective**
Forms and number of hours of educational ectivities	L	C	LC	P	SW	FW	S	Semester	**1**
	15							No. of ECTS credits	**1**
Entry requirements	-								
Course objectives	Acquainting with current engineering problems as well as the newest tools and methods for their effective solution. Getting to know development trends in the field of industry digitization. Acquiring practical information in the field of design, commissioning and servicing of industry digitization systems.								
Course content	Lecture: Current problems, methods and tools used by engineers in various industries. Presentation of the latest engineering solutions and methods, including tools and computer systems used in the industry digitization. Trends in the development of automation, electronics and electrical engineering as well as industry digitization.								
Teaching methods	Informative-problem lecture;								
Assessment method	Lecture: one test								

Symbol of learning outcome	Learning outcomes	Reference to the learning outcomes for the field of study
	Knowledge: the graduate knows and understands	
LO1	trends, solutions, methods, tools and systems used in industry digitization	CP1_W11 CP1_W12 CP1_W14
LO2	principles and methods of selecting literature sources in the field of industry digitization	CP1_W11 CP1_W12 CP1_W14
LO3	methods of effective individual and team work and the principles of planning his/her professional development	CP1_W11 CP1_W12 CP1_W14
	Social competences: the graduate is ready to	
LO7	behave professionaly and take care of extending the importance of the industrial digitization engineer	CP1_K02
LO8	take into account principles of sustainable development when planning his/her engineering activities	CP1_K05

Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed	
LO1	Lecture: one test;	W	
LO2	Lecture: one test;	W	
LO3	Lecture: one test;	W	
LO7	Lecture: one test;	W	
LO8	Lecture: one test;	W	
Student workload (in hours)		No. of hours	
Calculation	Lecture attendance	15	
	Preparation for lecture test(s)	5	
	Participation in teacher-student sessions related to the module subject	5	
	TOTAL	25	
Quantitative indicators		Hours	ECTS
Student workload - activities that require direct teacher participation		20	0,8
Student workload - practical activities		0	0
Basic references	1. Kacalak W., Sysło W. A., Przemysł 4.0: algorytmizacja problemów oraz digitalizacja procesów i urządzeń 2019. Wydawnictwo Akademii im. Jakuba z Paradyża, Gorzów Wielkopolski 2020. 2. Calisir F., Akdag H. C., Industrial engineering in the Industry 4.0 era. Global Joint Conference on Industrial Engineering and its Applications Areas, GJCIE 2017, July 20-21, Vienna, Austria. 3. Karkalos N. E., Markopoulos A. P., Davim J. P., Computational methods for application in Industry 4.0. Springer, Cham 2019.		
Supplementary references	1. Didactic aids of the teacher. Technical and design documentation. Technical guides. Internet sources, e.g. https://przemysl-40.pl; https://przemyslprzyszlosci.gov.pl; https://www.digitaleurope.org/		
Organisational unit conducting the course	Department of Automatic Control and Robotics	Date of issuing the programme	
Author of the programme	dr hab. inż. Zbigniew Kulesza, prof. PB	2022-06-07	

Bialystok University of Technology
Faculty of Electrical Engineering

Field of study	**Industry Digitization**							Degree level and programme type	**full-time Bachelor's degree**
Specjalization / diploma path	**common subject**							Study profile	**general academic**
Course name	**Innovative solutions for engineering problems**							Course code	**CP1S01009**
								Course type	**elective**
Forms and number of hours of educational ectivities	L	C	LC	P	SW	FW	S	Semester	**1**
	15							No. of ECTS credits	**1**
Entry requirements	-								
Course objectives	Gaining knowledge of the methodology of creating new innovative ideas and solving engineering problems.								
Course content	Lecture: Overcoming barriers to creative problem solving, stimulating imagination and creativity, methods of identifying and visualizing problems, methods of generating new ideas, reviewing techniques of creative thinking, technical systems and their functions. Subsystems and supersystems, a systemic perspective, laws of technical systems development. Analysis of techniques of innovative approach to solving problems of production systems.								
Teaching methods	Informative-problem lecture;								
Assessment method	Lecture: one test								

Symbol of learning outcome	Learning outcomes	Reference to the learning outcomes for the field of study
	Knowledge: the graduate knows and understands	
LO1	innovative tools and techniques supporting the work of an industrial digitization engineer	CP1_W11 CP1_W12 CP1_W14
LO2	principles of selection and evaluation of literature sources necessary in engineering practice	CP1_W11 CP1_W12 CP1_W14
LO3	innovative methods of team and individual work and principles of planning his/her professional development	CP1_W11 CP1_W12 CP1_W14
	Social competences: the graduate is ready to	
LO7	behave professionally and take care of extending the importance of industry digitization	CP1_K02
LO8	take into account principles of sustainable development when planning his/her engineering activities	CP1_K05

Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed	
LO1	Lecture: one test;	W	
LO2	Lecture: one test;	W	
LO3	Lecture: one test;	W	
LO7	Lecture: one test;	W	
LO8	Lecture: one test;	W	
Student workload (in hours)		No. of hours	
Calculation	Lecture attendance	15	
	Preparation for lecture test(s)	5	
	Participation in teacher-student sessions related to the module subject	5	
	TOTAL	25	
Quantitative indicators		Hours	ECTS
Student workload - activities that require direct teacher participation		20	0,8
Student workload - practical activities		0	0
Basic references	1. Ikovenko S. Współczesna Teoria Rozwiązywania Innowacyjnych Zadań, Novosimo, Warszawa 2017. 2. Cempel C., Inżynieria kreatywności w projektowaniu innowacji. Politechnika Poznańska, Poznań 2013. 3. Ohno T., System produkcyjny toyoty. Więcej niż produkcja na dużą skalę. ProdPress. com, Wrocław (2008): 17. 4. Eckes G., Rewolucja Six Sigma: jak General Electric i inne przedsiębiorstwa zmieniły proces w zyski. MT Biznes, 2010.		
Supplementary references	1. DeBono E., Myślenie równoległe, Wydawnictwo Prima, Warszawa 1998. 2. Alder H., Inteligencja kreatywna, Wydawnictwo Amber, Warszawa 2003. 3. Kelley T., Littman J., Sztuka innowacji, lekcja kreatywności z doświadczeń czołowej amerykańskiej firmy projektowej, MT Biznes, Warszawa 2009. 4. Michalewicz Z., Fogel D.B., Jak to rozwiązać czyli nowoczesna heurystyka, WNT, Warszawa 2006.		
Organisational unit conducting the course	Department of Automatic Control and Robotics	Date of issuing the programme	
Author of the programme	dr inż. Roman Trochimczuk	2022-06-07	

Bialystok University of Technology
Faculty of Electrical Engineering

Field of study	**Industry Digitization**							Degree level and programme type	**full-time Bachelor's degree**
Specjalization / diploma path	**common subject**							Study profile	**general academic**
Course name	**Methodology of studies**							Course code	**CP1S01010**
								Course type	**elective**
Forms and number of hours of educational ectivities	L	C	LC	P	SW	FW	S	Semester	**1**
	30							No. of ECTS credits	**2**
Entry requirements	-								
Course objectives	Acquainting with the specificity of studying industry digitization. Shaping an active and creative attitude of the participant in the educational process. Initiating effective learning methods.								
Course content	Lecture: Learning outcomes. Study plan and education program. Syllabus. Information sources. Academic discussion as an element of studying. Expressing opinions about the subject and the teacher. Importance of cooperation between teachers and students. Mutual learning as the most effective method of acquiring knowledge and skills.								
Teaching methods	Informative-problem lecture;								
Assessment method	Lecture: two tests								

Symbol of learning outcome	Learning outcomes	Reference to the learning outcomes for the field of study
	Knowledge: the graduate knows and understands	
LO1	key learning outcomes related to the field of study	CP1_W11 CP1_W13
LO2	engineering methods and methods of searching for literature sources necessary for the implementation of a given task	CP1_W11 CP1_W13
LO3	principles of effective notes taking in the form of e.g. a mind map	CP1_W11 CP1_W13
	Social competences: the graduate is ready to	
LO7	comply with the rules of professional ethics	CP1_K02
LO8	follow principles of sustainable development when planning his/her engineering career	CP1_K05

Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed
LO1	Lecture: two tests;	W

LO2	Lecture: two tests;	W	
LO3	Lecture: two tests;	W	
LO7	Lecture: two tests;	W	
LO8	Lecture: two tests;	W	
Student workload (in hours)		No. of hours	
Calculation	Lecture attendance	30	
	Preparation for lecture test(s)	15	
	Participation in teacher-student sessions related to the module subject	5	
	TOTAL	50	
Quantitative indicators		Hours	ECTS
Student workload - activities that require direct teacher participation		35	1,4
Student workload - practical activities		0	0
Basic references	1. Wybrane artykuły bieżące i archiwalne z Forum Akademickiego (dostęp on-line https://primo-48pbk.hosted.exlibrisgroup.com/primo-explore/fulldisplay?docid=48PBK_sfx3790000000123553&context=L&vid=48PBK_VIEW) 2. Materiały Ogólnopolskiej Konferencji Dydaktyki Akademickiej, http://www.ideatorium.ug.edu.pl (25/05/2022). 3. Materiały corocznej konferencji "e-Technologie w Kształceniu Inżynierów" w Zeszyty Naukowe Wydziału Elektrotechniki i Automatyki Politechniki Gdańskiej dostęp on-line (https://etee.agh.edu.pl/o-etee/) (25/05/2022) 4. Kotarski R., Włam się do mózgu.; ISBN : 978-83-948712-1-5.		
Supplementary references	1. https://braingym.pl/jak-skutecznie-sie-uczyc-najlepsze-sposoby/ (10/02/2022) 2. https://studia.pl/jak-sie-uczyc-sposoby-belfra-na-efektywna-i-skuteczna-nauke/ (10/02/2022) 3. http://dydaktyka-akademicka.pl/1 (10/02/2022)		
Organisational unit conducting the course	Department of Electrical Engineering, Energoelectronics and Electroenergetics	Date of issuing the programme	
Author of the programme	dr inż. Jarosław Makal	2022-06-07	

Bialystok University of Technology
Faculty of Electrical Engineering

Field of study	**Industry Digitization**							Degree level and programme type	**full-time Bachelor's degree**
Specjalization / diploma path	**common subject**							Study profile	**general academic**
Course name	**Development of professional career**							Course code	**CP1S01011**
								Course type	**elective**
Forms and number of hours of educational ectivities	L	C	LC	P	SW	FW	S	Semester	**1**
	30							No. of ECTS credits	**2**
Entry requirements	-								
Course objectives	Discussion of the legal grounds related to studies. Presentation of methods of acquiring knowledge, acquiring skills, taking into account the specificity of technical studies in the field of industry digitization. Indication of methods of self-education and development of professional competences. Overview of career development paths. Professional qualifications. Discussion of the principles and methods of teamwork. Presentation of issues related to studying, taking into account the interdisciplinarity and complementarity of knowledge. Professional ethics, engineer ethics, professional responsibility.								
Course content	Lecture: Discussion and explanation of issues related to student's rights and obligations. Learning outcomes and methods of studying. Principles of effective study, self-education, shaping own development path within the framework of studies. Methods of obtaining information. Team work: rules and methods of work, student projects. Commercialization of student projects as an introduction to a professional career. Professional career: types of career, career models, shaping a professional development path in the field of industry digitization. Professional qualifications, certificates, professional exams. Interdisciplinarity and complementarity of knowledge as the key to creating new projects. Principles of sustainable development.								
Teaching methods	Informative-problem lecture;								
Assessment method	Lecture: two tests								

Symbol of learning outcome	Learning outcomes	Reference to the learning outcomes for the field of study
	Knowledge: the graduate knows and understands	
LO1	basic goals and learning outcomes defined within the field of study	CP1_W11 CP1_W13
LO2	principles of information sources and working methods selection to solve a given engineering task	CP1_W11 CP1_W13
LO3	selected methods of notation and knowledge representation to describe his/her own activities	CP1_W11 CP1_W13

	Social competences: the graduate is ready to	
LO7	comply with the rules of professional ethics	CP1_K02
LO8	plan, shape an engineering career, acquire new professional qualifications, take into account the principles of sustainable development	CP1_K05

Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed
LO1	Lecture: two tests;	W
LO2	Lecture: two tests;	W
LO3	Lecture: two tests;	W
LO7	Lecture: two tests;	W
LO8	Lecture: two tests;	W

Student workload (in hours)		No. of hours
Calculation	Lecture attendance	30
	Preparation for lecture test(s)	15
	Participation in teacher-student sessions related to the module subject	5
	TOTAL	50

Quantitative indicators	Hours	ECTS
Student workload - activities that require direct teacher participation	35	1,4
Student workload - practical activities	0	0

Basic references	1. Oleksyn T., Zarządzanie kompetencjami : teoria i praktyka. Wolters Kluwer Polska, Warszawa 2018. 2. Suchar M., Modele karier : przewidywanie kolejnego kroku. Wydawnictwo C.H. Beck, Warszawa 2010. 3. Filipowicz G., Zarządzanie kompetencjami : perspektywa firmowa i osobista, Wolters Kluwer Polska, Warszawa 2019. 4. Różański A., Rozwój zasobów ludzkich : teoria i praktyka. Politechnika Lubelska, Lublin 2008.
Supplementary references	1. Berne E., W co grają ludzie – psychologia stosunków międzyludzkich, Wydawnictwo Naukowe PWN , Warszawa 2004. 2. Krzemień G., Własna firma krok po kroku : działaj skutecznie na każdym etapie rozwoju swojego biznesu. "MT Biznes", Warszawa 2019. 3. Moczydlowska J., Zarządzanie kompetencjami zawodowymi a motywowanie pracowników. Difin, Warszawa 2008.

Organisational unit conducting the course	Department of Electrical Engineering, Energoelectronics and Electroenergetics	Date of issuing the programme
Author of the programme	dr hab. inż. Bogusław Butryło, prof. PB	2022-06-07

Bialystok University of Technology
Faculty of Electrical Engineering

Field of study	**Industry Digitization**							Degree level and programme type	**full-time Bachelor's degree**
Specjalization / diploma path	**common subject**							Study profile	**general academic**
Course name	**Physical education 1**							Course code	**CP1S01012**
								Course type	**elective**
Forms and number of hours of educational ectivities	L	C	LC	P	SW	FW	S	Semester	**1**
		30						No. of ECTS credits	**0**
Entry requirements	-								
Course objectives	Interest in physical culture and sports activities. Developing physical fitness, developing proper hygiene and health habits preparing for spending free time actively and effectively regenerating the body. Teaching and improvement of technical and tactical elements in practiced sports disciplines. Acquainting with sports equipment located in gyms and in the aerobics room and with the methods of its use. Getting to know the rules in gyms, enabling safe exercise.								
Course content	Classes: Sports disciplines: futsal, volleyball, basketball, table tennis, aerobics, strength training. Sports rules for the sports disciplines exercised. Participation in departmental games. Conducting a proper warm-up. Developing basic motor skills. The technique of working on the equipment in the gym. Body shaping exercises. Methods of building muscle mass, shaping strength, power, local strength endurance. Methods of reducing adipose tissue. Preparation for independent exercise and planning a training unit in the gym and in the aerobics room. Practical applications of tactics and techniques in practiced sports games.								
Teaching methods	Classes;								
Assessment method	Test (a written essay on physical culture, sport or recreation for students with a full sick leave from p.e.								

Symbol of learning outcome	Learning outcomes	Reference to the learning outcomes for the field of study
	Skills: the graduate is able to	
LO4	apply the rules of safe use of sports facilities and devices to practice various sports disciplines	CP1_U12
LO5	follow basic rules and use tactical and technical elements of sports disciplines carried out during PE classes, cooperate in a team, participate in sports competition (group games) - applies to sports games classes	CP1_U01 CP1_U03

LO6	use technical skills during the game, carry out a correct warm-up, make a simplified training plan for him/herself and do exercises shaping the individual muscles and features of the muscular system	CP1_U01 CP1_U03
Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed
LO4	Test (a written essay on physical culture, sport or recreation for students with a full sick leave from p.e.;	C
LO5	Test (a written essay on physical culture, sport or recreation for students with a full sick leave from p.e.;	C
LO6	Test (a written essay on physical culture, sport or recreation for students with a full sick leave from p.e.;	C
LO7	Test (a written essay on physical culture, sport or recreation for students with a full sick leave from p.e.;	C

Student workload (in hours)		No. of hours
Calculation	Classes attendance	30
	Preparation for classes completion	6
	Participation in teacher-student sessions related to the module subject	5
	TOTAL	41

Quantitative indicators	Hours	ECTS
Student workload - activities that require direct teacher participation	35	0
Student workload - practical activities	41	0

Basic references	1. Delavier F., Gundill M., Modelowanie sylwetki metodą Delaviera: ćwiczenia i programy treningu siłowego. PZWL, Warszawa, 2012. 2. Grządziel G., Piłka siatkowa. Wydawnictwo Akademii Wychowania Fizycznego im. Jerzego Kukuczki, Katowice, 2012. 3. Kuba L., Paruzel-Dyja M., Fitness: nowoczesne formy gimnastyki: podstawy teoretyczne: podręcznik dla instruktorów, studentów i nauczycieli wychowania fizycznego. Wydawnictwo Akademii Wychowania Fizycznego im. Jerzego Kukuczki, Katowice, 2013. 4. Valdericeda F., Futsal: taktyka i ćwiczenia taktyczne. MH, Ruda Śląska, 2012. 5. Wróblewski F., Koszykówka (historia, zasady, trening). Dragon, Bielsko-Biała, 2011.
Supplementary references	1. Clemenceau J-P., Delavier F., Stretching: ilustrowany przewodnik. PZWL, Warszawa, 2012. 2. Delavier F., Atlas treningu siłowego. PZWL, Warszawa, 2011. 3. Wołyniec J. (red.), Przepisy gier sportowych w zakresie podstawowym. BK, Wrocław, 2006. 4. Wróblewski F., Siatkówka, Dragon, Bielsko-Biała, 2010.

Organisational unit conducting the course	School of Physical Education and Sports	Date of issuing the programme
Author of the programme	dr Piotr Klimowicz	2022-06-07