

Białystok University of Technology										
Field of study	Automatic Control and Robotics							Degree level and programme type	full-time Bachelor's degree	
Specialization / diploma path	common subject							Study profile	general academic	
Course name	Mathematics I							Course code	MYARS01001	
								Course type	obligatory	
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	1	
	45	45	0	0	0	0	0	No. of ECTS credits	8	
Entry requirements	-									
Course objectives	Acquainting with the basic laws of logic. Acquainting with the basics of differential and integral calculus of functions of one variable and preparation for their use in the further education cycle. Ability to analyze the properties of functions of one variable based on boundaries and derivatives. Acquainting with the basics of vector calculus and methods of linear algebra and preparation for using them in solving engineering problems.									
Course content	Lecture and classes: Elements of mathematical logic. The function of one variable and its properties. Cyclometric functions.Sequences and numerical series. Number e. Limit and continuity of a function. Derivative of a function. Monotonicity and extremes. Power series, Taylor series and Maclaurin series. The indefinite integral and methods of its determination (integration by parts and by substitution, integration of rational and trigonometric functions). Definite integral and its geometrical applications. Improper integral. Complex numbers, exponentiation and the roots of complex numbers. Algebraic, trigonometric and exponential form of a complex number. Vector calculus on the plane and in space. Matrix algebra. Determinant, rank of matrices. Systems of linear equations (Cramer formulas, Gauss elimination). Eigenvectors and eigenvectors of the matrix. Functions of several variables. Partial derivatives of the 1st order of multivariable functions.									
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	
LO1	knows, understands and can apply the principles of differentiating the function of one variable to the analysis of the properties of these functions								AR1_W02 AR1_U02	
LO2	understands and correctly applies the laws of logic in the reasoning								AR1_W02 AR1_U02	
LO3	knows and can apply the basics of vector, matrix, algebra of complex numbers								AR1_W02 AR1_U02	
LO4	knows and can apply the laws of the integral calculus of one variable in simple calculations								AR1_W02 AR1_U02	
Symbol of learning outcome	Methods of assessing the learning outcomes								Type of tuition during which the outcome is assessed	
LO1	Lecture: exam; Classes: two tests;								W C	
LO2	Lecture: exam; Classes: two tests;								W C	
LO3	Lecture: exam; Classes: two tests;								W C	
LO4	Lecture: exam; Classes: two tests;								W C	
Student workload (in hours)								No. of hours		
Calculation	Lecture attendance								45	
	Classes attendance								45	
	Preparation for the lecture exam; participation in the exam								58	
	Preparation for classes								38	
	Preparation for classes completion								9	
	Participation in teacher-student sessions related to the module subject								5	
	TOTAL								200	
Quantitative indicators								Hours	ECTS	
Student workload - activities that require direct teacher participation								97	3,9	
Student workload - practical activities								97	3,9	

Basic references	1. McQuarrie D. A., Mathematical methods for scientists and engineers, University Science Books, 2003. 2. Swokowski E. W., Calculus with analytic geometry. Prindle, Weber and Schmidt, 1983. 3. Zill D. G., Differential Equations, Thomson, 2005.	
Organisational unit conducting the course	Katedra Automatyki i Robotyki	Date of issuing the programme
Author of the programme	dr hab. Ewa Pawłuszewicz, prof. PB	2019-09-23

Białystok University of Technology										
Field of study	Automatic Control and Robotics							Degree level and programme type	full-time Bachelor's degree	
Specialization / diploma path	common subject							Study profile	general academic	
Course name	Technical drawing in electrical engineering							Course code	MYARS01002	
								Course type	obligatory	
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	1	
	15	0	0	30	0	0	0	No. of ECTS credits	3	
Entry requirements	-									
Course objectives	Obtaining knowledge in the field of mapping and dimensioning of parts of electrical and electronic equipment and preparation of technical documentation of the electrical part of the project. Developing skills in drawing electrical and electronic components and devices, as well as their connections, 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 perform freehand and schematic drawings, including preparation of printouts and technical reports.									
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. Method of creating electrical technical documentation. Legal acts and standardization in the scope of creating technical documentation of the electrical part of the project. Principles of technical electrical drawing and electromechanical parts. Types of electrical diagrams. Rules for preparing assembly diagrams. Methods for preparing printouts and reports. Project: Creating sketches. Projection of electromechanical parts in projections. Creating power circuit diagrams. Creating control circuit diagrams. Creating operator panel diagrams. Creating assembly diagrams. Circuit design with PLCs.									
Teaching methods	Informative-problem lecture; Project classes;									
Assessment method	Lecture: one test Project: evaluation of project completion, current progress in project completion, discussion and activity during the classes									
Symbol of learning outcome	Learning outcomes								Reference to the learning outcomes for the field of study	
LO1	has knowledge of the use of engineering graphics elements for mapping spatial electromechanical elements and industrial automation								AR1_W07	
LO2	has knowledge of the application of the principles of electrical technical drawing in the electrotechnical part and industrial automation								AR1_W07	
LO3	can reproduce electromechanical parts and draw assembly, power supply and control diagrams								AR1_U06	
LO4	can prepare technical documentation in the electromechanical part and industrial automation								AR1_W07 AR1_U06	
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	Project: evaluation of project completion, current progress in project completion, discussion and activity during the classes;								P	
LO4	Lecture: one test; Project: evaluation of project completion, current progress in project completion, discussion and activity during the classes;								W P	
Student workload (in hours)								No. of hours		
Calculation	Lecture attendance								15	
	Project attendance								30	
	Preparation for lecture test(s)								5	
	Preparation for project classes								6	
	Working on projects (including preparation of presentations)								12	
	Preparation for projects completion								2	
	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		55	2,2
Basic references	1. Systemy elektronicznej pomocy programów Autodesk Autocad Electrical, IGE XAO SEE Electrical, ProfiCAD. 2. Sapiński T., Michel K., Rysunek techniczny elektryczny, WNT, Warszawa 1987. 3. Michel T., Sapiński K., Czytam rysunek elektryczny. WSiP, Warszawa 1999. 4. PN-79/E-01244 Rysunek techniczny elektryczny. Klasyfikacja. Nazwy i określenia. 5. PN-EN 61082-1:2006 (U) Przygotowanie dokumentów stosowanych w elektrotechnice – Część 4: Dokumenty dotyczące lokalizacji i instalowania.		
Supplementary references	1. PN-EN 61082-1:2006 (U) Przygotowanie dokumentów używanych w elektrotechnice – Część 1: Podstawowe zasady. 2. PN-EN 61082-1:2006 (U) Przygotowanie dokumentów stosowanych w elektrotechnice – Część 2: Schematy dotyczące funkcji. 3. PN-EN 61082-1:2006 (U) Przygotowanie dokumentów stosowanych w elektrotechnice – Część 3: Schematy połączeń, tabele i zestawienia.		
Organisational unit conducting the course	Katedra Elektroenergetyki, Fotoniki i Techniki Świetlnej	Date of issuing the programme	
Author of the programme	dr hab. inż. Maciej Zajkowski, prof. PB	2019-09-23	

Bialystok University of Technology										
Field of study	Automatic Control and Robotics							Degree level and programme type	full-time Bachelor's degree	
Specialization / diploma path	common subject							Study profile	general academic	
Course name	Technical drawing in mechanical engineering							Course code	MYARS01003	
								Course type	obligatory	
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	1	
	15	0	0	30	0	0	0	No. of ECTS credits	3	
Entry requirements	-									
Course objectives	Obtaining knowledge in the field of mapping and dimensioning of machine parts. Developing the ability to draw parts of machines on drawings, as well as their connections (temporary and permanents) in assembly drawings. Acquainting with the principles of dimensioning, tolerating and shaping the geometric structure of the surface. Acquiring the ability to read and create schematic drawings of machine assemblies and to make freehand drawings of simple details.									
Course content	Lecture: Orthographic projection of spatial elements into one, two and three viewports. Polish Norms in engineering graphics. Creating views, full sections, removed sections and broken-out section. Dimensioning and tolerance of dimensions. Free and tolerated dimensions. Accuracy classes. Tolerances of shape and position. Compound tolerances. Surface condition (roughness, coating designation). Temporary and permanents connections. Workshop and assembly drawings. Schematic drawing. Project: Drawing views and cross-sections. Workshop drawing of selected machine components (dimensions, tolerances, roughness). Drawing mechanical connections. Assembly drawing (views, full section, broken-out section, part specification) and schematic.									
Teaching methods	Informative-problem lecture; Project classes;									
Assessment method	Lecture: one test Project: evaluation of project completion, current progress in project completion, discussion and activity during the classes									
Symbol of learning outcome	Learning outcomes							Reference to the learning outcomes for the field of study		
LO1	defines principles of graphic mapping and dimensioning of parts of machines							AR1_W07		
LO2	defines the methodology of designing mechanical devices							AR1_W07		
LO3	is able to map components of machine parts using engineering graphics							AR1_U06		
LO4	can use specialized knowledge in order to prepare correct technical documentation							AR1_W07 AR1_U06		
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	Project: evaluation of project completion, current progress in project completion, discussion and activity during the classes;							P		
LO4	Lecture: one test; Project: evaluation of project completion, current progress in project completion, discussion and activity during the classes;							W P		
Student workload (in hours)								No. of hours		
Calculation	Lecture attendance							15		
	Project attendance							30		
	Preparation for lecture test(s)							5		
	Preparation for project classes							6		
	Working on projects (including preparation of presentations)							12		
	Preparation for projects completion							2		
	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		55	2,2
Basic references	1. Burcan J., Podstawy rysunku technicznego. Wydawnictwa Naukowo Techniczne, Warszawa, 2010. 2. Fołęga P., Zasady zapisu konstrukcji części maszyn. Wydawnictwo Politechniki Śląskiej, Gliwice, 2011. 3. Dobrzański T. Rysunek techniczny Maszynowy. Wydawnictwa Naukowo Techniczne, Wydanie dwudzieste szóste, Warszawa, 2015. 4. Lewandowski T., Rysunek techniczny dla mechaników. Wydawnictwa Szkolne i Pedagogiczne, Warszawa, 2009.		
Supplementary references	1. Simmons C. H., Maguire D. E., Phelps N., Manual of engineering drawing. Newnes, Amsterdam, 2009. 2. Krawczuk M., Biereg K., Doliński Ł., Projektowanie urządzeń elektromechanicznych. Wydawnictwo Politechniki Gdańskiej, Gdańsk, 2006. 3. Polskie Normy, PKNMiJ.		
Organisational unit conducting the course	Katedra Budowy Maszyn i Techniki Ciepłej	Date of issuing the programme	
Author of the programme	dr inż. Grzegorz Mieczkowski	2019-09-23	

Bialystok University of Technology										
Field of study	Automatic Control and Robotics							Degree level and programme type	full-time Bachelor's degree	
Specialization / diploma path	common subject							Study profile	general academic	
Course name	Engineering materials							Course code	MYARS01004	
								Course type	obligatory	
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	1	
	30	0	15	0	0	0	0	No. of ECTS credits	4	
Entry requirements	-									
Course objectives	Acquainting with the basics of materials science. Gaining knowledge about the most important engineering materials, methods of their research and development trends. Acquainting with the basics of selection of materials for specific purposes.									
Course content	Lecture: Classification and general characteristics of engineering materials. Crystalline and amorphous structure and defects of materials. Basics of heat and thermo-chemical treatment. Overview of basic groups of metal alloys: iron, copper, aluminum and titanium based alloys. Selected precious metal alloys. Non-metallic materials: plastics, ceramics, composites. Materials for special applications: functional, structural, adhesives, among others. Rules for the selection of materials. Electrical, magnetic, thermal and mechanical properties of materials. Basic material testing methods. Trends in the development of engineering materials. Laboratory: Familiarization with materials testing methods. Microscopic observation of the structure of metals. Testing the basic mechanical properties of engineering materials. Polimers and composites materials. Characterisation of ceramics and glass materials.									
Teaching methods	Informative-problem lecture; Laboratory classes;									
Assessment method	Lecture: exam 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	
LO1	knows and characterizes basic groups of engineering materials								AR1_W03	
LO2	knows methods of shaping the structure and properties of materials								AR1_W03	
LO3	knows and classifies treatments of thermal and thermal chemistry of metals								AR1_W03 AR1_W02	
LO4	can choose materials meeting specific goals								AR1_W03 AR1_U05 AR1_U08	
LO5	is able to plan and perform basic materials tests								AR1_W03 AR1_U04 AR1_U12	
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	Lecture: exam; Laboratory: evaluation of introductory tests, reports, discussion and activity during the classes;								W L	
LO5	Lecture: exam; Laboratory: evaluation of introductory tests, reports, discussion and activity during the classes;								W L	
Student workload (in hours)								No. of hours		
Calculation	Lecture attendance								30	
	Laboratory classes attendance								15	
	Preparation for the lecture exam; participation in the exam								27	
	Preparation for laboratory classes								20	
	Preparation for laboratory classes completion								3	
	Participation in teacher-student sessions related to the module subject								5	
	TOTAL								100	
Quantitative indicators								Hours	ECTS	
Student workload - activities that require direct teacher participation								52	2.1	

Student workload - practical activities		43	1,7
Basic references	1. Ashby M., Sherclif H., Cebon D., Inżynieria materiałowa. Tom 1, 2. Wydawnictwo Galaktyka, Łódź, 2011. 2. Dobrzański L., Wprowadzenie do nauki o materiałach. Wydawnictwo PŚI, Gliwice, 2007. 3. Ciszewski A., Radomski T., Szummer A., Materiałoznawstwo. Oficyna Wydawnictwo PW, Warszawa, 2009. 4. Przybyłowicz K., Przybyłowicz J., Materiałoznawstwo w pytaniach i odpowiedziach. WNT, Warszawa, 2000. 5. Celińska Z., Materiałoznawstwo elektrotechniczne. Wydawnictwo Politechniki Warszawskiej, Warszawa 1998		
Supplementary references	1. Schulz, M.J., Kelkar A.D., Sundaresan M.J., Nanoengineering of structural, functional and smart materials. Taylor & Francis Group, Boca Raton-London-New York, 2006. 2. Dobrzański L., Podstawy nauki o materiałach i metaloznawstwo. WNT, Warszawa, 2002. 3. Askeland, Donald R. The science and engineering of materials. Stamford, Cengage Learning, 2011. 4. Celiński Z., Materiałoznawstwo elektrotechniczne, OWPW Warszawa., 2011		
Organisational unit conducting the course	Katedra Inżynierii Materiałowej i Produkcji	Date of issuing the programme	
Author of the programme	dr hab. inż. Zbigniew Oksiuta, prof. PB	2019-09-23	

Bialystok University of Technology										
Field of study	Automatic Control and Robotics							Degree level and programme type	full-time Bachelor's degree	
Specialization / diploma path	common subject							Study profile	general academic	
Course name	Operating systems: Linux and Android							Course code	MYARS01005	
								Course type	obligatory	
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	1	
	15	0	0	30	0	0	0	No. of ECTS credits	4	
Entry requirements	-									
Course objectives	Gaining knowledge of the construction, functioning and possibilities of using Linux and Android operating systems. Gaining practical skills in system configuration, text processing, practical application of tools available in Linux and Android.									
Course content	Lecture: Operating systems - basic concepts, definitions, elements of architecture. Linux: bash shell, command prompt. Linux: scripting in the shell. Linux: file and directory systems, file system management. Linux: users and permissions. Introduction to regular expressions, grep command. Linux: stream editors: sed, awk. Linux: processing automation - make command. Android: architecture and configuration. Android: permissions. Project: Linux: system installation. Linux: work with the command line. Linux: scripting in the shell. Linux: working with files and directories, managing file systems. Linux: user management and permissions. Linux: grep command. Linux: stream editors: sed, awk. Linux: make command. Android: configuration. Android: permissions.									
Teaching methods	Informative-problem lecture; Project classes;									
Assessment method	Lecture: one test Project: evaluation of project completion, current progress in project completion, discussion and activity during the classes									
Symbol of learning outcome	Learning outcomes								Reference to the learning outcomes for the field of study	
LO1	knows and understands the ability to configure Linux and Android operating systems								AR1_W04	
LO2	knows and understands Linux system commands to work with the system and data processing, mainly text files								AR1_W04	
LO3	is able to configure elements of the Linux and Android operating system								AR1_U03	
LO4	is able to prepare a processing system, including a script, a configuration file or a command, to perform a data processing task, mainly text files								AR1_U03	
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	Project: evaluation of project completion, current progress in project completion, discussion and activity during the classes;								P	
LO4	Project: evaluation of project completion, current progress in project completion, discussion and activity during the classes;								P	
Student workload (in hours)								No. of hours		
Calculation	Lecture attendance								15	
	Project attendance								30	
	Preparation for lecture test(s)								14	
	Preparation for project classes								18	
	Working on projects (including preparation of presentations)								12	
	Preparation for projects completion								6	
	Participation in teacher-student sessions related to the module subject								5	
	TOTAL								100	
Quantitative indicators								Hours	ECTS	

Student workload - activities that require direct teacher participation		50	2
Student workload - practical activities		71	2,8
Basic references	1. Tanenbaum A. S., Systemy Operacyjne. Wydawnictwo Helion, Gliwice 2010. 2. Stallings W., Systemy operacyjne. Struktura i zasady budowy. Wydawnictwa Naukowe PWN, Warszawa 2006. 3. Shotts W. E. Jr., Linux: wprowadzenie do wiersza poleceń. Helion, Gliwice 2015. 4. Sosna Ł., Linux: komendy i polecenia. Helion, Gliwice 2014. 5. Dokumentacja systemu Android na stronach http://android.com/ .		
Supplementary references	1. Kuźniar K., Programowanie w Linuksie: ćwiczenia. Helion, Gliwice 2012. 2. Sobell M. G., Linux: programowanie w powłoce: praktyczny przewodnik. Helion, Gliwice 2014. 3. Lal K. Linux: komendy i polecenia: praktyczne przykłady. Helion, Gliwice 2005. 4. Dokumentacja on-line wybranego systemu Linux.		
Organisational unit conducting the course	Katedra Systemów Informacyjnych i Sieci Komputerowych	Date of issuing the programme	
Author of the programme	dr inż. Tomasz Grześ	2019-09-23	

Białystok University of Technology									
Field of study	Automatic Control and Robotics							Degree level and programme type	full-time Bachelor's degree
Specialization / diploma path	common subject							Study profile	general academic
Course name	Computer networks							Course code	MYARS01006
								Course type	obligatory
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	1
	15	0	0	30	0	0	0	No. of ECTS credits	4
Entry requirements	-								
Course objectives	Gaining knowledge of the basics of building, operating and designing computer networks, also in terms of extending the use and administration skills of wired and wireless local networks.								
Course content	Lecture: Basic terms related to computer networks. Network classification and their main topologies. Description of the communication process using a layered OSI model. Basic network devices and transmission media. Basics of construction, configuration, use and administration of wired and wireless local area networks (LAN, WLAN): Ethernet, Wi-Fi. The concept and implementation of virtual local area networks (VLAN). Basic and auxiliary protocols used in packet networks: IP, UDP, TCP, ARP, ICMP. Addressing devices in networks with IPv4 and IPv6 protocols. Static and dynamic routing in IP networks. Organization and operation of the DNS domain name system. Basics of security issues in computer networks and methods of their protection. Project: The course includes preparation of computer network projects for home users or for small/medium companies. The projects take into account the implementation of the assumed functionalities, as well as data security, convenience of use, etc. During the classes the issues related to the technologies and standards used in projects are discussed, and in the final part of the semester, the prepared projects are presented and discussed.								
Teaching methods	Informative-problem lecture; Project classes;								
Assessment method	Lecture: exam Project: evaluation of project completion, current progress in project completion, discussion and activity during the classes								
Symbol of learning outcome	Learning outcomes							Reference to the learning outcomes for the field of study	
LO1	the student knows and understands the architecture and operation of technologies and devices used in wired and wireless local networks and is able to choose the right technologies and devices to meet the specified requirements,							AR1_W04 AR1_U03	
LO2	the student knows and understands the features and functions of the basic and auxiliary protocols used in computer networks and can determine selected parameters of these protocols to meet the assumed requirements,							AR1_W04 AR1_U03	
LO3	student is able to choose and integrate contemporary solutions, technologies, protocols and products in the field of computer networks in order to create a coherent network system that meets the listed requirements,							AR1_U03 AR1_U11	
LO4	the student is able to plan the process of creation of the design in the field of computer networks and to prepare a presentation about the completed project task.							AR1_U11	
Symbol of learning outcome	Methods of assessing the learning outcomes							Type of tuition during which the outcome is assessed	
LO1	Lecture: exam; Project: evaluation of project completion, current progress in project completion, discussion and activity during the classes;							W	P
LO2	Lecture: exam; Project: evaluation of project completion, current progress in project completion, discussion and activity during the classes;							W	P
LO3	Project: evaluation of project completion, current progress in project completion, discussion and activity during the classes;								P
LO4	Project: evaluation of project completion, current progress in project completion, discussion and activity during the classes;								P
Student workload (in hours)								No. of hours	
Calculation	Lecture attendance							15	

	Project attendance	30	
	Preparation for the lecture exam; participation in the exam	16	
	Preparation for project classes	17	
	Working on projects (including preparation of presentations)	12	
	Preparation for projects completion	5	
	Participation in teacher-student sessions related to the module subject	5	
	TOTAL	100	
Quantitative indicators		Hours	ECTS
Student workload - activities that require direct teacher participation		52	2,1
Student workload - practical activities		69	2,8
Basic references	1. Tanenbaum Andrew S., Wetherall David J., Sieci komputerowe. Wydanie V, Helion, Gliwice 2012. 2. Zaręba P., Praktyczne projekty sieciowe. Helion, Gliwice, 2019. 3. Roshan P., Leary J., Bezprzewodowe sieci LAN 802.11. Podstawy. Wydawnictwo PWN-MIKOM, Warszawa, 2006. 4. Materials from the lecture.		
Supplementary references	1. Kurose James F., Keith W. Ross., Computer Networking: A Top-Down Approach. 4th edition. Pearson/Addison Wesley, Boston 2008. 2. Józefiak A., CCNA 200-125. Zostań administratorem sieci komputerowych Cisco. Helion, Gliwice, 2017. 3. Stallings W., Brown L., Bezpieczeństwo systemów informatycznych. Zasady i praktyka. Wydanie IV. Tom 1 i 2. Helion, Gliwice, 2019. 4. RFC documents (available on the Internet: http://www.rfc-editor.org).		
Organisational unit conducting the course	Katedra Telekomunikacji i Aparatury Elektronicznej	Date of issuing the programme	
Author of the programme	dr inż. Andrzej Zankiewicz	2019-09-23	

Białystok University of Technology											
Field of study	Automatic Control and Robotics							Degree level and programme type	full-time Bachelor's degree		
Specialization / diploma path	common subject							Study profile	general academic		
Course name	Occupational safety and health							Course code	MYARS01007		
								Course type	obligatory		
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	1		
	15	0	0	0	0	0	0	No. of ECTS credits	1		
Entry requirements	-										
Course objectives	Familiarizing with the general principles of health and safety at work. Acquaintance with selected issues related to fire protection. Acquaintance with the principles and methods of first aid.										
Course content	Basic legal regulations in the field of occupational health and safety. Threats occurring in the work environment and methods of their limitation. Dangerous, harmful and arduous factors in human surroundings. Requirements for the size and equipment of work rooms. Safety signs and symbols. Rules and methods of providing pre-medical first aid. Rescue of persons electrocuted. Fire protection of facilities: fire fighting procedures, the concept of an escape route, fire fighting rules and methods.										
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		
LO1	knows and understands the requirements of applicable regulations regarding health and safety at work								AR1_W10 AR1_K02		
LO2	knows the organism's hazards in the work environment								AR1_W10		
LO3	knows the types of fires and describes the methods of extinguishing them								AR1_W10		
LO4	lists the rules and describes the methods of providing pre-medical first aid knows and understands the principles of using ergonomics								AR1_W10 AR1_K03		
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		
LO4	Lecture: one test;								W		
LO5	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, 2010.										

	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	Katedra Elektroenergetyki, Fotoniki i Techniki Świetlnej	Date of issuing the programme
Author of the programme	dr inż. Grzegorz Hołdyński	2019-09-23

Bialystok University of Technology										
Field of study	Automatic Control and Robotics							Degree level and programme type	full-time Bachelor's degree	
Specialization / diploma path	common subject							Study profile	general academic	
Course name	Psychology							Course code	MYARS01008	
								Course type	elective	
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	1	
	15	0	0	0	0	0	0	No. of ECTS credits	1	
Entry requirements	-									
Course objectives	Providing information in the field of psychology that is important in professional and social functioning. Shaping the ability to analyze social phenomena - their perception, evaluation and explanation - in the context of knowledge about the properties of the mental functioning of a human being. An indication of the importance of social competences in professional and especially team work. Characterization of conflicts in the workplace and occupational stress (causes of occurrence, course and methods of elimination).									
Course content	Basic information in the field of general psychology. Psychic processes: relations between the cognitive and affective spheres, their role in collecting and evaluating knowledge about themselves, the physical and social world. Basics of social psychology, understanding of one's own person and the social world, disposable structures of the psyche (the concept of the self). Characteristics of the process of social cognition and assessment of people during social interactions. Psychological interpretation of social influence and methods of interaction during interpersonal contacts and analysis of social relations. Psychological determinants of teamwork and factors determining the effectiveness of teamwork.									
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	
LO1	knows, understands and characterizes main theoretical trends in psychology, defines basic conceptual categories and uses them								AR1_W09	
LO2	knows, understands and characterizes cognitive and affective processes, presents their mutual relations and determines the role (also in the field of professional functioning)								AR1_W09	
LO3	knows the basics of social cognition, social impact and social relations								AR1_W09	
LO4	knows the mechanisms of shaping personality (the concept of "I"), the system of values, attitudes, principles and norms, explains their cultural determinants and is ready to respect the diversity of views and cultures								AR1_W09 AR1_K03	
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	
LO4	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. Aronson E., Wilson T.D., Akert R.M., Psychologia społeczna. Serce i umysł. Zysk i S-ka, Poznań 2008. 2. Cialdini R., Wymieranie wpływu na ludzi. GWP, Gdańsk 2010. 3. Gellert M., Nowak C., Zespół. GWP, Gdańsk 2008. 4. Rathus S.A., Psychologia współczesna. GWP, Gdańsk 2004.									

	5. Zimbardo P.G. – Psychologia i życie, Warszawa 2008.	
Supplementary references	1. Boski P., Kulturowe ramy zachowań społecznych. PWN, Warszawa 2009. 2. Doliński D., Techniki wpływu społecznego. Scholar, Warszawa 2005. 3. Kenrick D.T., Neuberg S.L., Cialdini R. Psychologia społeczna. GWP, Gdańsk 2002. 4. Wojciszke B., Psychologia miłości. Intymność. Namiętność. Zaangażowanie, Gdańsk 2009. 5. Wojciszke B., Psychologia społeczna. Scholar, Warszawa 2011.	
Organisational unit conducting the course	Katedra Ekonomii i Nauk Społecznych	Date of issuing the programme
Author of the programme	dr Andrzej Smolarczyk	2019-09-23

Białystok University of Technology										
Field of study	Automatic Control and Robotics							Degree level and programme type	full-time Bachelor's degree	
Specialization / diploma path	common subject							Study profile	general academic	
Course name	Sociology							Course code	MYARS01009	
								Course type	elective	
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	1	
	15	0	0	0	0	0	0	No. of ECTS credits	1	
Entry requirements	-									
Course objectives	Acquainting with the function and role of sociology as a science in social, economic and cultural life. Presentation of research methods used in sociology and their practical use in technology. Acquainting with these areas of sociology, which are the most important from the point of view of modern technology. Presenting basic sociological knowledge in its practical aspect.									
Course content	Information in the field of general sociology, needed to understand the functioning of modern society. The concept of sociology and its subject. Research methods in sociology. Social issues: social structures, society, social groups, small social groups: family, social circle, large social groups. The concepts of the state, the nation, national minorities, the intelligentsia, the power elite. Typology of leadership, political, organizational, religious and social leadership. Sociological concept of personality and temperament. The functioning of a man in the process of socialization, the importance of conformism as a way of adapting the individual to society. The phenomenon of mobbing, intercultural differences in the aspect of communication and the causes and ways of solving social conflicts.									
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	
LO1	knows, understands social structures and institutions, and relationships between them								AR1_W09	
LO2	has sociological knowledge about people and understands interpersonal relationships								AR1_W09	
LO3	knows the rules of communication in the workplace and is ready to behave in a professional manner								AR1_W09 AR1_K05	
LO4	understands ways of managing people and leading a group of people								AR1_W09	
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	
LO4	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. Sztompka P., Socjologia. Analiza społeczeństwa, „Znak”, Kraków 2012. 2. Giddens A., Socjologia, Wydawnictwo Naukowe PWN, Warszawa 2005. 3. Szacka B., Wprowadzenie do socjologii, Oficyna Naukowa, Warszawa 2008. 4. Encyklopedia socjologii, t. 1-5, Oficyna Naukowa, Warszawa 2000.									
Supplementary references	1. Wnuk-Lipiński E., Socjologia życia publicznego, Wydawnictwo Scholar, Warszawa 2006. 2. Współczesne społeczeństwo polskie. Dynamika zmian, Wasilewski J. (red.), Scholar, Warszawa 2006.									

	3. Giddens A., Stanowienie społeczeństwa, Warszawa 2003. 4. Goffman E., Człowiek w teatrze życia codziennego, Warszawa 2011.	
Organisational unit conducting the course	Katedra Ekonomii i Nauk Społecznych	Date of issuing the programme
Author of the programme	dr Andrzej Smolarczyk	2019-09-23

Bialystok University of Technology										
Field of study	Automatic Control and Robotics							Degree level and programme type	full-time Bachelor's degree	
Specialization / diploma path	common subject							Study profile	general academic	
Course name	Economy for engineers							Course code	MYARS01010	
								Course type	elective	
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	1	
	15	0	0	0	0	0	0	No. of ECTS credits	1	
Entry requirements	-									
Course objectives	Mastering the precise use of basic economic categories, acquiring knowledge necessary to analyze the behavior of economic entities on the market, understanding the functioning of the national and international economy, particular product markets, services, production factors and financial markets. Learning the ability to determine the causes and effects of phenomena in contemporary economic reality, reception and understanding of market signals in a selected industry, establishing the relationship between changes in the macroeconomic environment and decisions of companies in this industry.									
Course content	Economics as a social science. Market analysis. Consumer decisions. Theory of production and production costs. Company decisions. Markets of production factors. Factors determining the demand for labor and labor supply. Capital market analysis. National income and growth factors. Economy of well-being. The theory of market failure. Public goods and externalities. The state budget and the money and credit system. Theories of inflation and anti-inflation policy. Unemployment as a basic macroeconomic problem. Monetary and fiscal policy instruments. Trade and international finance. The problem of financialization of modern economies. Analysis of international turnovers of highly processed products and services. Economic situation and business cycle. Economic integration. Determinants of economic growth - the level of income and consumption. Global economy.									
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	
LO1	knows and understands basic economic categories and basic principles of functioning of the economy								AR1_W09	
LO2	knows and understands the behavior of economic entities in the changes in the macroeconomic environment								AR1_W09	
LO3	can determine the causes and effects of selected phenomena in the economy								AR1_U05	
LO4	can predict the company's decisions in response to exogenous and endogenous variables								AR1_U05 AR1_K04	
LO5	can describe the functioning of selected markets: products, services and factors of production								AR1_U05 AR1_K04	
LO6	is ready to think and act in an entrepreneurial way								AR1_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	
LO3	Lecture: one test;								W	
LO4	Lecture: one test;								W	
LO5	Lecture: one test;								W	
LO6	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. Podstawy ekonomii, red. Milewski R., PWN, Warszawa 2005. 2. Samuelson P. A., Nordhaus W. D., Ekonomia t. 1 i 2, PWN, Warszawa 2004. 3. Mikro i makroekonomia. Podstawowe problemy współczesności, red. Marciniak S., Wydawnictwo Naukowe PWN, Warszawa 2013.		
Supplementary references	1. Sopoćko A., Mit pieniądza, Wydawnictwo Naukowe PWN, Warszawa 2015. 2. Sedláček T., Ekonomia dobra i zła, Wydawnictwo Studio EMKA, Warszawa 2012. 3. Giddens A., Europa w epoce globalnej, PWN, Warszawa 2009. 4. Nojszewska E., Podstawy ekonomii, Wydawnictwa Szkolne i Pedagogiczne, Warszawa 1999.		
Organisational unit conducting the course	Zakład Ekonomii Menedżerskiej	Date of issuing the programme	
Author of the programme	dr Krystyna Zimnoch	2019-09-23	

Białystok University of Technology										
Field of study	Automatic Control and Robotics							Degree level and programme type	full-time Bachelor's degree	
Specialization / diploma path	common subject							Study profile	general academic	
Course name	Accounting for engineers							Course code	MYARS01011	
								Course type	elective	
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	1	
	15	0	0	0	0	0	0	No. of ECTS credits	1	
Entry requirements	-									
Course objectives	Acquiring basic knowledge of cost accounting and the ability to use it in managing a modern enterprise, in particular familiarizing with the role and functions of cost accounting in the enterprise information system, defining costs and their classification according to different criteria, control and cost analysis based on cost budget, as well as concepts of strategic cost management.									
Course content	The essence and classification of costs according to various criteria. Cost measurement. Basic models of cost accounting. Calculation of costs in a systematic calculation. Variable cost accounting and its application in short-term decisions. Calculation in variable cost accounting. Standard cost account, Development of standards for normative costs. Basics of budgeting and cost control. Cost management through a deviation account. Modern cost accounting systems in management, including activity cost accounting (ABC), target costs and kaizen system and product life cycle costs.									
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	
LO1	knows and understands the concept of costs and distinguishes costs from expenditures and expenses								AR1_W09	
LO2	knows and understands the distribution of costs according to basic cost classification sections and knows the methods of their valuation								AR1_W09	
LO3	has basic knowledge of calculating an account - can perform basic cost calculations and link the cost account to the financial result of the company								AR1_W09 AR1_U05 AR1_K04	
LO4	knows and understands the basics of modern cost management								AR1_W09	
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	
LO4	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. Matuszek J., Kołosowski M., Kokosz-Krynke Z., Rachunek kosztów dla inżynierów, PWE, Warszawa 2011. 2. Świderska G. K. (red), Controlling kosztów i rachunkowość zarządcza, Difin, Warszawa 2010.									
Supplementary references	1. Matuszewicz J., Rachunek kosztów, FINANS-SERVIS, Warszawa 2009. 2. Nowak E., Strategiczne zarządzanie kosztami, Oficyna Ekonomiczna 2006. 3. Nowak E., Wierzbński M., Rachunek kosztów. Modele i zastosowania, PWE, Warszawa 2010. 4. Sobańska I. (red.), Rachunek kosztów i rachunkowość zarządcza, Wydawnictwo C.H. BECK, Warszawa 2003.									

	5. Horngren C. T., Datar S. M., Rajan M. V., Cost accounting: a managerial emphasis, Pearson Education, Boston 2015.	
Organisational unit conducting the course	Zakład Ekonomii Menedżerskiej	Date of issuing the programme
Author of the programme	dr inż. Jolanta Łuczaj	2019-09-23

Białystok University of Technology										
Field of study	Automatic Control and Robotics							Degree level and programme type	full-time Bachelor's degree	
Specialization / diploma path	common subject							Study profile	general academic	
Course name	History of technology							Course code	MYARS01012	
								Course type	elective	
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	1	
	15	0	0	0	0	0	0	No. of ECTS credits	1	
Entry requirements	-									
Course objectives	Acquainting with the development of technology against the background of the development of the Earth's civilization.									
Course content	The history of technical development with particular emphasis on the importance of the development of civilization resulting from the acquisition, production of new materials and their use for the design of machinery and technological equipment. The history of technical development in Poland and the role played by Poles in the development of technology. Stories of technical progress in selected fields (automatic control and robotics as well as technological devices) with particular emphasis on mechanical structures.									
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	
LO1	knows and understands the basics of the history of modern technical civilization								AR1_W09	
LO2	knows the historical and contemporary trends in the development of technology and science								AR1_W09	
LO3	is ready to self-education and can acquire knowledge and information about the surrounding objects of material and technical culture and communicate them in a clear and understandable way								AR1_U02 AR1_K01	
LO4	can use information techniques to acquire knowledge about the history of technology, scientific discoveries and inventions and its presentation								AR1_U02	
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	
LO4	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. Batur W., Technika. Spojrzenie na dzieje cywilizacji, PWN, Warszawa 2003. 2. Orłowski B., Historia techniki polskiej. Wydawnictwo Instytutu Technologii i Eksploatacji, Radom 2006. 3. Regis E., Nanotechnologia. Pruszyński i S-ka, Warszawa 2001. 4. Kaku M.,Wizje czyli jak nauka zmienia świat w Xxi wieku, Pruszyński i S-ka, Warszawa 2001. 5. Pater Z., Wybrane zagadnieniaz historii techniki, Politechnika Lubelska, Lublin 2011.									
Supplementary references	1. Zubrin R., Narodziny cywilizacji kosmicznej, Pruszyński i S-ka 2003. 2. Źródła internetowe, czasopisma branżowe.									
Organisational unit conducting	Katedra Budowy Maszyn i Techniki Ciepłej								Date of issuing the programme	

the course		
Author of the programme	dr inż. Grzegorz Mieczkowski	2019-09-23

Białystok University of Technology										
Field of study	Automatic Control and Robotics							Degree level and programme type	full-time Bachelor's degree	
Specialization / diploma path	common subject							Study profile	general academic	
Course name	Environmental management and ecology							Course code	MYARS01013	
								Course type	elective	
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	1	
	15	0	0	0	0	0	0	No. of ECTS credits	1	
Entry requirements	-									
Course objectives	Understanding the role of the environment in socio-economic development. Acquisition of knowledge about the environmental management system in Poland and in the world. Acquiring the ability to take into account environmental issues in business.									
Course content	Environment as a management object: basic terms and problems. The concept of sustainable development as the basis for environmental management. Environmental management system in Poland. Environmental management measures, including objectives and principles of the state's environmental policy. Environmental management instruments (legal-administrative, economic, social impacts). Selected areas of environmental management (e.g. waste management, water and sewage management, climate protection, protection of biodiversity). Environmental management in the enterprise (ISO 14001 and EMAS).									
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	
LO1	knows and understands facts and phenomena and their methods and theories explaining the relationship between the economy and the environment								AR1_W09	
LO2	knows and understands the basics of environmental management and the concept of sustainable development as the basis for environmental management								AR1_W09	
LO3	can observe and interpret selected issues regarding environmental aspects of the engineer's activity								AR1_W09 AR1_U05	
LO4	is ready to analyze the environmental effects of the engineer's work and responsibility for the decisions made in this regard								AR1_W09 AR1_K03	
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	
LO4	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. Zarządzanie środowiskiem, (red.) Poskrobko B., PWE, Warszawa 2007. 2. Ekonomia i zarządzanie ochroną środowiska dla inżynierów, (red.) Broniewicz E., Godlewska J., Miłaszewski R., Oficyna Wydawnicza Politechniki Białostockiej, Białystok 2009. 3. Kowal E., Kucińska-Landwójtowicz A., Misiólek A., Zarządzanie środowiskowe, PWE, Warszawa 2013. 4. Gospodarowanie i zarządzanie środowiskiem, (red.) Kryk B., Wydawnictwo Naukowe Uniwersytetu Szczecińskiego, Szczecin 2012.									
Supplementary	1. Wyzwania zrównoważonego rozwoju w Polsce, (red.) Kronenberg J., Bergier T., Fundacja Sendzimira,									

references	Kraków 2010. 2. Niemiec W. i in., Aspekty zarządzania środowiskiem w praktyce inżynierskiej, Oficyna Wydawnicza Politechniki Rzeszowskiej, Rzeszów 2013. 3. Ciechanowicz-McLean J., Prawo ochrony i zarządzania środowiskiem, Difin, Warszawa 2015.	
Organisational unit conducting the course	Katedra Zarządzania Produkcją	Date of issuing the programme
Author of the programme	dr inż. Joanna Godlewska	2019-09-23