

Bialystok University of Technology									
Field of study	Automatic Control and Robotics							Degree level and programme type	full-time Master's degree
Specialization / diploma path	common subject							Study profile	general academic
Course name	Implementation of control algorithms							Course code	MYAR2S03001
								Course type	obligatory
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	3
	15	0	15	30	0	0	0	No. of ECTS credits	5
Entry requirements	Real time controllers, Control theory								
Course objectives	Acquainting with methods of software and hardware implementation of control algorithms in FPGA programmable devices. Acquiring the ability to implement control algorithms in programmable FPGAs.								
Course content	Lecture: The process of designing control algorithms in FPGAs. The use of signal processing blocks. Laboratory: The use of design and simulation software for programming, testing and implementation of elements of architecture of control algorithms in the FPGA device. Project: Designing the software and hardware implementation of the selected control algorithm in the FPGA device.								
Teaching methods	Informative-problem lecture; Laboratory classes; Project classes;								
Assessment method	Lecture: one test Laboratory: evaluation of introductory tests, reports, discussion and activity during the classes 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 process of designing control algorithms in FPGAs							AR2_W04 AR2_W05	
LO2	knows and understands the ways of implementing individual components of the control algorithm architecture in FPGAs							AR2_W04 AR2_W05	
LO3	can program, test and implement individual components of the control algorithm architecture in the FPGA device							AR2_U03 AR2_U04 AR2_U05	
LO4	can design, test and implement a complete control algorithm in the FPGA device							AR2_U03 AR2_U04 AR2_U05	
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	Laboratory: evaluation of introductory tests, reports, discussion and activity during the classes; Project: evaluation of project completion, current progress in project completion, discussion and activity during the classes;							L P	
LO4	Laboratory: evaluation of introductory tests, reports, discussion and activity during the classes; Project: evaluation of project completion, current progress in project completion, discussion and activity during the classes;							L P	
Student workload (in hours)								No. of hours	
Calculation	Lecture attendance							15	
	Laboratory classes attendance							15	
	Project attendance							30	
	Preparation for lecture test(s)							13	
	Preparation for laboratory classes							11	
	Preparation for laboratory classes completion							3	
	Preparation for project classes							16	
	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							125		
Quantitative indicators								Hours	ECTS
Student workload - activities that require direct teacher participation								65	2,6

Student workload - practical activities		97	3,9
Basic references	1. Kulesza Z., Programowanie sterowników czasu rzeczywistego w układach PLD i FPGA. Oficyna Wydawnicza Politechniki Białostockiej, Białystok 2015. 2. Pawłowski M., Projektowanie złożonych układów cyfrowych. WKiŁ, Warszawa 2010. 3. Zwolinski M., Projektowanie układów cyfrowych z wykorzystaniem języka VHDL. WKiŁ, Warszawa 2006.		
Supplementary references	1. Zieliński T., Cyfrowe przetwarzanie sygnałów. Od teorii do zastosowań, WKŁ, Warszawa 2009. 2. Majewski J., Zbysiński P., Układy FPGA w przykładach. Wydawnictwo BTC, Warszawa 2007. 3. Chu P. P., FPGA prototyping by VHDL examples. Wiley 2008.		
Organisational unit conducting the course	Katedra Automatyki i Robotyki	Date of issuing the programme	
Author of the programme	dr hab. inż. Zbigniew Kulesza, prof. PB	2019-09-23	

Bialystok University of Technology									
Field of study	Automatic Control and Robotics							Degree level and programme type	full-time Master's degree
Specialization / diploma path	common subject							Study profile	general academic
Course name	Diploma seminar							Course code	MYAR2S03002
								Course type	elective
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	3
	0	0	0	0	0	0	30	No. of ECTS credits	2
Entry requirements	-								
Course objectives	Summary of knowledge and skills acquired during studies. Gaining the ability to discuss and analyze relevant technical problems. Application of acquired knowledge and skills to solve indicated engineering and research problems. Acquainting with the principles of elaborating and presenting the results of the diploma thesis.								
Course content	Instructions for writing large compact texts. Developing the ability to use different sources of information. Mastering computer programs used to present his/her thesis, eg Power Point. Shaping the skills of conducting discussions in a large group. Exchange of knowledge between graduates by presenting fragments of individual dissertations. Training of the ability to present a large amount of information in a condensed form within a limited time. Awareness of the need for self-education, observance of copyright and intellectual property, counteracting plagiarism and application of professional ethics. Preparation to present his/her achievements and team discussions through numerous presentations during seminar classes.								
Teaching methods	Seminar classes;								
Assessment method	Seminar: evaluation of presentation of the thesis, discussion and activity during the seminar								
Symbol of learning outcome	Learning outcomes							Reference to the learning outcomes for the field of study	
LO1	defines development trends and knows the latest developments in the field of automatic control and robotics							AR2_W07 AR2_K02	
LO2	knows and understands the concepts and principles of intellectual property protection, industrial and copyright and patent law							AR2_W09	
LO3	is able to obtain information from literature, databases, catalog sheets, technical instructions, application notes and other sources; is able to integrate the information obtained, make its interpretation and critical assessment, as well as draw conclusions and formulate and comprehensively justify the opinions							AR2_U02	
LO4	can prepare and present a presentation on the implementation of the diploma thesis, lead the discussion on the presented presentation							AR2_W08	
LO5	uses in practice different methods to elaborate the results of the experiment, project task or research team, can prepare a study including a discussion of these results							AR2_U04	
Symbol of learning outcome	Methods of assessing the learning outcomes							Type of tuition during which the outcome is assessed	
LO1	Seminar: evaluation of presentation of the thesis, discussion and activity during the seminar;							S	
LO2	Seminar: evaluation of presentation of the thesis, discussion and activity during the seminar;							S	
LO3	Seminar: evaluation of presentation of the thesis, discussion and activity during the seminar;							S	
LO4	Seminar: evaluation of presentation of the thesis, discussion and activity during the seminar;							S	
LO5	Seminar: evaluation of presentation of the thesis, discussion and activity during the seminar;							S	
Student workload (in hours)								No. of hours	
Calculation	Seminar attendance							30	

	Preparation for the seminar	3	
	Preparation for seminar completion	12	
	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		50	2
Basic references	1. Podstawowa literatura z którą student stykał się podczas studiów. 2. Literatura związana z tematyką pracy dyplomowej i uzgodniona z promotorem pracy. 3. J. Boć, Jak pisać pracę magisterską, Kolonia, Wrocław 2001. 4. Cabarelli G., Łucki Z., Jak przygotować pracę dyplomową lub doktorską, Universitas, Kraków 1998.		
Supplementary references	1. Monografie, podręczniki, artykuły, katalogi, strony internetowe w zakresie potrzeb dla poszczególnych prac dyplomowych. 2. Kolman R., Zdobywanie wiedzy. Poradnik podnoszenia kwalifikacji (magisteria, doktoraty, habilitacje), Oficyna Wydawnicza Branta, Bydgoszcz-Gdańsk, 2003.		
Organisational unit conducting the course	Katedra Automatyki i Robotyki	Date of issuing the programme	
Author of the programme	prof. dr hab. inż. Zdzisław Gosiewski	2019-09-23	

Bialystok University of Technology										
Field of study	Automatic Control and Robotics							Degree level and programme type	full-time Master's degree	
Specialization / diploma path	common subject							Study profile	general academic	
Course name	Innovative enterprise and technology transfer							Course code	MYAR2S03003	
								Course type	elective	
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	3	
	15	15	0	0	0	0	0	No. of ECTS credits	2	
Entry requirements	-									
Course objectives	Acquainting with the basic concepts in the area of innovation, innovation processes and technology transfer. Familiarizing with the principles and laws of the functioning of an innovative enterprise. Shaping the skills of analysis and assessment of processes taking place in enterprises. Developing skills in the field of innovation and technology transfer, developing a business model of an innovative enterprise. Discussion of examples of methods of creating innovation.									
Course content	Lecture: Definition of innovation, types and sources of innovation. Diffusion of innovation. Innovation models. Definition of technology transfer, types and forms of technology transfer. Sources of technology transfer. Technology transfer and innovative activity of companies. Technology transfer in innovation models. Sources of inspiration for innovative ventures. Methods of creating innovations. Phases of the implementation of an innovative business venture. Business model and business plan. Elements of business plan and business model. Sources of financing innovative projects. International technology transfer. Classes: Creating an innovative enterprise business model (customer segments, value proposition, channels, customer relations, revenue streams, key resources, key activities, key partners, cost structure).									
Teaching methods	Informative-problem lecture; Classes;									
Assessment method	Lecture: one test Classes: one test									
Symbol of learning outcome	Learning outcomes							Reference to the learning outcomes for the field of study		
L01	understands the basic concepts of innovation and technology transfer							AR2_W08		
L02	recognizes and classifies elements of the business model							AR2_W10		
L03	is able to use sources of inspiration and methods of creating innovation							AR2_U01		
L04	identifies the basic skills necessary to create innovative undertakings and acts in an entrepreneurial way							AR2_U07		
L05	is ready to think and act in a way that uses methods of creating innovation and to take actions for the public interest							AR2_K04 AR2_K05		
Symbol of learning outcome	Methods of assessing the learning outcomes							Type of tuition during which the outcome is assessed		
L01	Lecture: one test;							W		
L02	Lecture: one test;							W		
L03	Classes: one test;							C		
L04	Classes: one test;							C		
L05	Lecture: one test; Classes: one test;							W C		
Student workload (in hours)							No. of hours			
Calculation	Lecture attendance							15		
	Classes attendance							15		
	Preparation for lecture test(s)							7		
	Preparation for classes							5		
	Preparation for classes completion							3		
	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		28	1,1
Basic references	<ol style="list-style-type: none"> 1. Matusiak K. B., Innowacje i transfer technologii. Słownik pojęć. Polska Agencja Rozwoju Przedsiębiorczości, Warszawa 2008. 2. Christensen K., Clayton M., Przelomowe innowacje. Wydawnictwo Profesjonalne PWN. Warszawa 2010. 3. Cieślik J., Przedsiębiorczość dla ambitnych. Jak uruchomić własny biznes, Wydawnictwa Akademickie i Profesjonalne, Warszawa 2008. 4. Skowronek J., Mielczarek A., Małe i średnie przedsiębiorstwa. Źródła finansowania, Wydawnictwo C. H. BECK, Warszawa 2007. 5. Osterwalder A., Pigneur Y., Tworzenie modeli biznesowych. One Press, 2013. 		
Supplementary references	<ol style="list-style-type: none"> 1. Piaseczny J., Biznes Plan. Problemy i metody. Wydawnictwo WSPiZ im. L. Koźmińskiego, Warszawa 2002. 2. Santarek K., Transfer technologii z uczelni do biznesu. PARP, Warszawa 2008. 3. Drucker P. F., Innowacje i przedsiębiorczość, Praktyka i zasady. Wydawnictwo ekonomiczne, Warszawa 1992. 4. Brown T., Change by design: how design thinking transforms organizations and inspires innovation. Harper Business, New York 2009. 5. Osterwalder A., Pigneur Y., Bernarda G., Smith A., Projektowanie propozycji wartości, ICAN, 2016. 		
Organisational unit conducting the course	Katedra Mechaniki i Informatyki Stosowanej	Date of issuing the programme	
Author of the programme	dr Izabela Senderacka	2019-09-23	

Białystok University of Technology									
Field of study	Automatic Control and Robotics							Degree level and programme type	full-time Master's degree
Specialization / diploma path	common subject							Study profile	general academic
Course name	World economy							Course code	MYAR2S03004
								Course type	elective
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	3
	15	0	0	0	0	0	0	No. of ECTS credits	1
Entry requirements	-								
Course objectives	Introducing and familiarizing with the problems of functioning of the modern world economy. Acquainting with the consequences of changes in the size and structure of capital flows, exchange rates, the level of competitiveness and innovation of countries and regions, and the functioning and role of international organizations and institutions in the modern world.								
Course content	The concept and structure of the global economy. Globalization and its consequences for the economy. Structural changes in global production and trade. Direct investments in the global economy. Global financial markets. Exchange rates and their role in the modern economy. International competitiveness and innovation of countries and regions. International institutions and their role in the 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 the problems of the modern world economy, its structure and trends, international institutions and organizations and relations between markets and countries								AR2_W08
LO2	knows international phenomena and trends, such as: globalization, regionalization, foreign investments, internationalization of markets								AR2_W08
LO3	knows economic factors and phenomena that affect for international competitiveness and innovation of countries and regions and is aware of the importance and impact of engineering activities								AR2_W08
LO4	is ready to recognize the importance of knowledge of the world economy in the daily practice of an engineer								AR2_K02
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	<ol style="list-style-type: none"> Skodlarski J., Matera R., Wydawnictwo Naukowe PWN, Warszawa 2018. Olszewski J. (red.), Gospodarka światowa i krajowa. Jej wyzwania we współczesnych czasach, Naukowe Wydawnictwo IVG, Szczecin 2015. Orłowska R., Żołądkiewicz K. (red.), Globalizacja i regionalizacja w gospodarce światowej, PWE, Warszawa 2012. Zielińska-Głębocka A., Współczesna gospodarka światowa, Wolters Kluwer, Warszawa 2012. 								

Supplementary references	1. Budnikowski A., Ekonomia międzynarodowa, PWE, Warszawa 2017. 2. Varoufakis Y., Globalny minotaur: Ameryka, Europa i przyszłość światowej gospodarki, PWE, Warszawa 2015. 3. Marszałek-Kawa J., Gawłowski R. (red.), W kierunku nowego ładu gospodarczego: rola Azji w XXI wieku, Wydawnictwo Adam Marszałek, Toruń 2014.	
Organisational unit conducting the course	Katedra Marketingu i Przedsiębiorczości	Date of issuing the programme
Author of the programme	dr Iwona Piekunko-Mantiuk	2019-09-23

Białystok University of Technology										
Field of study	Automatic Control and Robotics							Degree level and programme type	full-time Master's degree	
Specialization / diploma path	common subject							Study profile	general academic	
Course name	Founding and financing of start-ups							Course code	MYAR2S03005	
								Course type	elective	
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	3	
	15	0	0	0	0	0	0	No. of ECTS credits	1	
Entry requirements	-									
Course objectives	Providing the necessary knowledge related to the verification of the business idea, the procedure for starting your own business, creating a business model and the possibilities of financing enterprises in the early stages of development (start-up).									
Course content	Idea and market opportunity - sources and methods of verification. The stages of enterprise development. Business models - elements, methods and principles of elaboration. Own, alien and hybrid financing - differences, advantages and disadvantages. Traditional sources of financing: bank loans, loans, depreciation, retained earnings, issue of securities, leasing. Unconventional financing (alternative): venture capital / private equity funds, business angels, crowdfunding, securitization, factoring and forfaiting, off-balance sheet sources. Financial forms of startup support by business environment institutions: subsidies, grants. Non-financial forms of startup support.									
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 and legal-economic conditions of the start-up							AR2_W08 AR2_W10		
LO2	knows aid programs aimed at supporting entrepreneurship and micro and small enterprises and understands their logic of operation							AR2_W08 AR2_W10		
LO3	knows the rules of creating and developing enterprises in various stages of development and understands the specificity of startups							AR2_W10		
LO4	knows sources and formal conditions of legal support							AR2_W08 AR2_W10		
LO5	is ready to think and act in an entrepreneurial way, including the benefits for the social environment							AR2_K03 AR2_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		
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	<ol style="list-style-type: none"> Wieczorek M., Prawo dla startupu. Wydawnictwo Helion, Gliwice 2017. Nehrebecka N., Bialek-Jaworska N., Dzik-Walczak A., Źródła finansowania przedsiębiorstw. Difin, Warszawa 2016. Grzywacz J. (red.), Źródła finansowania działalności rozwojowej przedsiębiorstw w Polsce. Difin, Warszawa 2016. 									

	4. Nielsen N. H., Finansowanie startupów. Poradnik przedsiębiorcy, Wydawnictwo Helion, Gliwice 2018.	
Supplementary references	1. Glinka B., Pasieczny J., Tworzenie przedsiębiorstwa. Szanse, realizacja, rozwój. Wydawnictwa Uniwersytetu Warszawskiego, Warszawa 2015. 2. Polskie startupy Raport 2017, Fundacja Startup Polska, Warszawa 2018. 3. Piekunko-Mantiuk I., Aniołowie biznesu i ich rola w finansowaniu startupów. Ekonomia i zarządzanie nr 4/2014. 4. Piekunko-Mantiuk I., Crowdfunding jako źródło finansowania start-upów oraz małych i średnich przedsiębiorstw. Przedsiębiorczość i Zarządzanie, tom XVII, zeszyt 7, część 3, Warszawa 2016.	
Organisational unit conducting the course	Katedra Marketingu i Przedsiębiorczości	Date of issuing the programme
Author of the programme	dr Iwona Piekunko-Mantiuk	2019-09-23

Białystok University of Technology									
Field of study	Automatic Control and Robotics							Degree level and programme type	full-time Master's degree
Specialization / diploma path	common subject							Study profile	general academic
Course name	Market investigations							Course code	MYAR2S03006
								Course type	elective
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	3
	15	0	0	0	0	0	0	No. of ECTS credits	1
Entry requirements	-								
Course objectives	Acquainting with selected methods of market research, used in various stages of business management, as well as the process of research implementation. Acquainting with the principles of: selecting market analysis methods for a specific company situation, planning the research process, preparing research tools, implementing research and reporting.								
Course content	Basic concepts of market research, methods of analysis of the enterprise environment, methods of competitive environment analysis, methods of demand analysis, methods of customer needs analysis, product research (new and existing on the market), methods and techniques of market research, the principles of selection of research methods and techniques of market research for a specific problem the company is facing.								
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 the basic concepts of market analysis							AR2_W08	
LO2	knows methods of analysis of the enterprise environment, competitive environment, demand analysis, analysis of customer needs							AR2_W08	
LO3	knows the principles of selecting market research methods to specific situations in which the enterprise operates							AR2_W08	
LO4	is ready to recognize the importance of market research knowledge in everyday practice engineer							AR2_K02	
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. Kauf S., Tłuczak A., Badania rynkowe w zarządzaniu łańcuchem dostaw, Difin, Warszawa 2015. 2. Kauf S., Badania rynkowe w sferze marketingu i logistyki, Wydawnictwo. Uniwersytetu Opolskiego, Opole 2004. 3. Gregor B., Kalińska-Kula M., Badania marketingowe na użytek decyzji menedżerskich, Wydawnictwo Uniwersytetu Łódzkiego, Łódź 2014.								
Supplementary references	1. Rószkiewicz M., Metody ilościowe w badaniach marketingowych, Wydawnictwo Naukowe PWN, Warszawa 2012.								

	2. Hague P., Badania marketingowe. Planowanie, metodologia i ocena wyników, Wydawnictwo Helion, Gliwice 2006. 3. Woźniakowski T., Jałowiecki P., Metodyczne oraz informatyczne aspekty badań rynkowych, Wydawnictwo SGGW, Warszawa 2012. 4. Bradley N., Marketing research: tools a. techniques, Oxford University Press, Oxford 2013.	
Organisational unit conducting the course	Katedra Marketingu i Przedsiębiorczości	Date of issuing the programme
Author of the programme	dr hab. Ewa Glińska	2019-09-23

Bialystok University of Technology									
Field of study	Automatic Control and Robotics							Degree level and programme type	full-time Master's degree
Specialization / diploma path	common subject							Study profile	general academic
Course name	Industrial marketing							Course code	MYAR2S03007
								Course type	elective
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	3
	15	0	0	0	0	0	0	No. of ECTS credits	1
Entry requirements	-								
Course objectives	Acquainting with the essence of industrial marketing. Showing the scope and importance of customer relations from the perspective of the company. Presentation of the specifics of industrial marketing tools. Determining the importance of marketing in engineering, industry and the development of new technologies. Showing the relationship between marketing and entrepreneurship.								
Course content	The concept of industrial marketing. Industrial marketing tools. Traditional and modern approach to marketing. Client in industrial marketing - B2B relations and B2C relations. The behavior of buyers in the enterprise market. Market segmentation and positioning in industrial marketing. Promotion on industrial markets. The importance of marketing in the development of new technologies.								
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
L01	knows and understands the concept of marketing and its role in the modern economy and dissemination of new technologies								AR2_W08
L02	knows marketing tools and their characteristics								AR2_W08
L03	understands the importance of marketing from the client's and company's point of view								AR2_W08
L04	knows and understands the concept of market segmentation, positioning								AR2_W08
L05	knows the areas of marketing use in engineering, including development of new technologies								AR2_W08
Symbol of learning outcome	Methods of assessing the learning outcomes								Type of tuition during which the outcome is assessed
L01	Lecture: one test;								W
L02	Lecture: one test;								W
L03	Lecture: one test;								W
L04	Lecture: one test;								W
L05	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. Baruk A., Hys K., Dzidowski A., Marketing dla inżynierów, PWE Warszawa, 2012. 2. Garbarski L. (red.), Marketing: koncepcja skutecznych działań. PWE Warszawa, 2011. 3. Golik - Górecka G., Marketing business to business, Difin Warszawa, 2004.								
Supplementary references	1. Kotler P., Marketing: od A do Z, PWE Warszawa, 2004. 2. Waniowski P., Sobotkiewicz D., Daszkiewicz M., Marketing: teoria i praktyka, Wydawnictwo Placet Warszawa, 2010.								

Organisational unit conducting the course	Katedra Marketingu i Przedsiębiorczości	Date of issuing the programme
Author of the programme	dr Urszula Widelska	2019-09-23

Bialystok University of Technology									
Field of study	Automatic Control and Robotics							Degree level and programme type	full-time Master's degree
Specialization / diploma path	common subject							Study profile	general academic
Course name	Management of project teams							Course code	MYAR2S03008
								Course type	elective
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	3
	15	0	0	0	0	0	0	No. of ECTS credits	1
Entry requirements	-								
Course objectives	Getting to know elements of project team management. Providing knowledge on the competences of a leader and a project team, organization of work in a project team, team building, risk management in a project team.								
Course content	Introduction to the management of project teams. Management of project teams as an element of project management. Management of the project team and the role of the project manager. Leaders' competences and styles of managing people. Recruitment and organization of a project team. Properties of group members - effective selection of participants and their social roles. Motivating and efficiency of the project team. Developing employees' competences and building the potential of the group. Teamwork problems - building relationships in a group and managing conflicts. Groups of project team management processes (initiating, planning, implementing, controlling, closing).								
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 the basic concepts in the field of project team management							AR2_W08	
LO2	knows the competencies necessary for work in a project team							AR2_W08	
LO3	knows the basic skills necessary to build a project team or participate in the work of a project team							AR2_W08	
LO4	is ready to act for the public interest							AR2_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	
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	<ol style="list-style-type: none"> Moczyłowska J., Kowalewski K., Nowe koncepcje zarządzania ludźmi. Wydawnictwo Difin, Warszawa 2014. Heidtman J., Piasecki P., Sensotwórczość - 7 sposobów tworzenia wartości w zespole i organizacji. Warszawa, MtBiznes, 2017. Adler R. B., Rosenfeld L. B., Proctor R. F., Relacje interpersonalne. Proces porozumiewania się. Poznań, Dom Wydawniczy Rebis, 2016. Skalik J. (red.), Zarządzanie projektami. Wrocław, Wydawnictwo Uniwersytetu Ekonomicznego we 								

	Wrocławiu, 2009. 5. Geller M., Nowak C., Zespół. Gdańsk, GWP, 2008.	
Supplementary references	1. Cialdini R., Wywieranie wpływu na ludzi, GWP, 2007 (oraz inne wydania) 2. Moczyłowska J. M., Professional competences of managers managing virtual teams. International Scientific Conference Globalisation Challenges and the Social-Economic Environment of the EU. Jasmina Starc (ed.), Nove Mesto; April 2015, pp. 426-432. 3. Donnelon A., Kierowanie zespołami. Osobisty mentor. Harvard Business School Press, 2007. 4. Bartkowiak G., Psychologia w zarządzaniu: nowe ujęcie. Poznań; Wydawnictwo Uniwersytetu Ekonomicznego, 2010. 5. Zawadzka A. M. (red.), Psychologia zarządzania w organizacji. PWN, 2010.	
Organisational unit conducting the course	Katedra Organizacji i Zarządzania	Date of issuing the programme
Author of the programme	mgr Joanna Szydło	2019-09-23

Bialystok University of Technology									
Field of study	Automatic Control and Robotics							Degree level and programme type	full-time Master's degree
Specjalization / diploma path	common subject							Study profile	general academic
Course name	Management of career							Course code	MYAR2S03009
								Course type	elective
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	3
	15	0	0	0	0	0	0	No. of ECTS credits	1
Entry requirements	-								
Course objectives	Acquainting with the elements that make up the professional image, so as to create it through application documents and during direct contact with the employer (during the interview). Acquainting with knowledge in the field of shaping and managing a career and ways of building a career path.								
Course content	Elements of the professional image; autopresentation tactics; the concept and meaning of career planning; career models; stages of career development, selected career management instruments; basic career development strategies.								
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 the elements that make up the professional image; knows the issues of motivation								AR2_W08
LO2	knows the issues associated with setting up a company								AR2_W08
LO3	knows the principles of analysis and evaluation of documentation necessary to implement the intended project								AR2_W08
LO4	is ready to responsibly perform the entrusted tasks, bringing his/her own ideas and solutions including legal and economic aspects								AR2_K06
LO5	is ready to think and act in an entrepreneurial way, to properly manage his/her professional career								AR2_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
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	<ol style="list-style-type: none"> 1. Rzepka B., Kariera pod kontrolą: jak zmienić swoje życie zawodowe na lepsze, Gliwice, Helion, 2011. 2. Suchar M., Modele karier: przewidywanie kolejnego kroku, Wydawnictwo C.H. Beck, Warszawa 2010. 3. Trunk P., Błyskotliwa kariera: nowe zasady sukcesu; przekł. [z ang.], MT Biznes, Warszawa 2008. 4. Zarządzanie karierą [przekł. z ang.], Warszawa: Wydawnictwo Studio EMKA, 2006. Seria Menedżer Skuteczny, Harvard Business School Press. 								
Supplementary references	1. Maslyk-Musiał E., Strategiczne zarządzanie zasobami, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2011.								

	2. Czarkowska L. D., Coaching as a method of developing human potential, Wydawnictwa Akademickie i Profesjonalne: Kozminski University, Warszawa 2010. 3. Richard L., Coaching i mentoring: jak rozwijać największe talenty i osiągnąć lepsze wyniki, Wydawnictwo MT Biznes, Warszawa 2006.	
Organisational unit conducting the course	Katedra Organizacji i Zarządzania	Date of issuing the programme
Author of the programme	mgr Joanna Szydło	2019-09-23

Bialystok University of Technology										
Field of study	Automatic Control and Robotics							Degree level and programme type	full-time Master's degree	
Specialization / diploma path	common subject							Study profile	general academic	
Course name	Specialistic lecture							Course code	MYAR2S03010	
								Course type	elective	
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	3	
	30	0	0	0	0	0	0	No. of ECTS credits	2	
Entry requirements	-									
Course objectives	Familiarizing with current scientific and engineering problems and latest achievements in the field of automatic control and robotics. Students will learn analytical and experimental methods used in industrial research centers, industrial laboratories, and automation and robotization systems.									
Course content	Current achievements and scientific and engineering methods used in industrial research centers and industrial laboratories. Computer support for scientific research in the field of automation and robotics. Modern management tools in enterprises operating in the field of economy using automation and robotics systems. Information systems for general access and cloud computing. Systems for digitizing production processes. Examples of using machine intelligence and machine learning algorithms. Quality management, control and supervision systems. Current internet technologies in automation and robotics.									
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		
LO1	has advanced knowledge of current scientific and engineering solutions and methods used in automation and robotics							AR2_W0 1	AR2_W0 3	AR2_W0 5
LO2	is able to obtain information on automation and robotics systems from various sources, also in foreign languages, make their proper selection and analysis							AR2_U02		
LO3	is ready to constantly improve professional qualifications							AR2_K06		
LO4	is ready to undertaking innovative and entrepreneurial activities, including those resulting from various social obligations							AR2_K03 AR2_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		
LO4	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. Lecturer's materials.									
Organisational unit conducting the course	Katedra Automatyki i Robotyki							Date of issuing the programme		
Author of the programme	dr hab. inż. Arkadiusz Mystkowski							2019-09-23		

Bialystok University of Technology									
Field of study	Automatic Control and Robotics							Degree level and programme type	full-time Master's degree
Specialization / diploma path	common subject							Study profile	general academic
Course name	Diploma thesis							Course code	MYAR2S03011
								Course type	elective
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	3
	0	0	0	0	0	0	0	No. of ECTS credits	15
Entry requirements	-								
Course objectives	The subject of the master thesis is to solve a problem / research or project task, or to refine or develop a research, computational, analytical and measurement method in the field of study and specialization. The work may also be a concept-design or study-research study in the field of a problem in the field of technical sciences; should include individual / new elaboration, analysis, experimental or theoretical / computational research preceded by the formulated objective of the thesis, review of the state of knowledge (proper selection of literature sources and their analysis) and the concept and assumptions required to solve the technical problem posed.								
Course content	Specialized knowledge and skills in the field of studied technical sciences. Formulating the purpose of the thesis, assumptions, choosing methods and tools to solve the problem. Analyzing literature materials in order to find or improve / develop new solutions of the task. Independent determination, development and presentation of solutions to technical problems and tasks. Verification of proposed solutions using the methods and tools of theoretical and experimental analysis. Supplementing interdisciplinary knowledge in the field of selected new solutions, methods and techniques in the field of automatic control and robotics. Methodology for analyzing the solution of a set research / project task and formulating conclusions. Documentation of thesis results in the form of tables, charts, patterns, programs / computer codes, multimedia presentations, etc.								
Teaching methods									
Symbol of learning outcome	Learning outcomes							Reference to the learning outcomes for the field of study	
L01	has a broad knowledge of development trends and the most important new achievements in the field of automatic control and robotics, life cycle of automation and robotics devices and systems, non-technical aspects of engineering activities							AR2_W07 AR2_W08	
L02	can acquire information from literature, databases and other sources in the scope of the subject of the thesis, can integrate and interpret information and draw conclusions and formulate specific objectives required to solve the problem							AR2_U02	
L03	can propose new / improved technical solutions and components (components, devices) to solve a given task							AR2_U01	
L04	can use the methods and techniques learned - if necessary, modifying them accordingly - to solve and analyze the problem							AR2_U01 AR2_U03	
L05	is able to plan and implement partial solutions of a technical task, organize experimental and simulation / analytical experiments using the methods / techniques and tools he / she knows							AR2_U04 AR2_U08	
L06	can work out results related to the implementation of the experiment, project or research task, can prepare oral presentations, written and multimedia presentations of the results of the thesis							AR2_U05	
L07	is ready to responsibly fulfill professional duties							AR2_K06	
Symbol of learning outcome	Methods of assessing the learning outcomes							Type of tuition during which the outcome is assessed	
	Student workload (in hours)							No. of hours	

Calculation	Editing of diploma thesis	125	
	Realization of the project/research related to diploma thesis	115	
	Collecting and studying literature related to diploma thesis	100	
	Participation in teacher-student sessions related to the module subject	35	
	TOTAL	375	
Quantitative indicators		Hours	ECTS
Student workload - activities that require direct teacher participation		35	1,4
Student workload - practical activities		340	13,6
Basic references	1. Boć J., Jak pisać pracę magisterską, Kolonia, Wrocław 2001. 2. Cabarelli G., Łucki Z., Jak przygotować pracę dyplomową lub doktorską, Universitas, Kraków 1998. 3. Literatura specjalistyczna - stosownie do tematu i zakresu pracy. 4. Katalogi, instrukcje techniczne, oraz źródła internetowe - stosowanie do tematu pracy.		
Supplementary references	1. Pułto A., Prace magisterskie i licencjackie. Wskazówki dla studentów, WP PWN, Warszawa 2000. 2. Urban S., Ładoński W., Jak napisać dobrą pracę magisterską, Wydawnictwo AE im. Oskara Langego, Wrocław 1997. 3. Kolman R., Zdobywanie wiedzy. Poradnik podnoszenia kwalifikacji (magisteria, doktoraty, habilitacje), Oficyna Wydawnicza Branta, Bydgoszcz-Gdańsk, 2003.		
Organisational unit conducting the course	Katedra Automatyki i Robotyki	Date of issuing the programme	
Author of the programme	prof. dr hab. inż. Zdzisław Gosiewski	2019-09-23	

Białystok University of Technology									
Field of study	Automatic Control and Robotics							Degree level and programme type	full-time Master's degree
Specialization / diploma path	common subject							Study profile	general academic
Course name	Vocational training							Course code	MYAR2S03012
								Course type	obligatory
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	3
	0	0	0	0	0	0	0	No. of ECTS credits	2
Entry requirements	-								
Course objectives	Vocational training is an integral part of higher education. It is an important element of preparing for future work. The training gives the opportunity to gain personal professional experience at a workplace in an industrial plant. It enables shaping practical skills based on the theoretical foundation. Practically it is used to build own work technique by verifying theoretical knowledge acquired during studies by direct work in a group of colleagues or a team. It gives the opportunity to gain personal professional experience and to develop practical skills based on the theoretical foundation.								
Course content	Getting to know the scope of duties and the rights of the trainee. Characteristics of the vocational training place. Getting to know technological processes and their characteristics at the place of doing the training. Knowledge and characteristics of technical devices used in technological processes. Participation in technological processes carried out at the place of the training. Practical participation in the implementation of tasks in the team of employees or independent implementation of the team's partial tasks.								
Teaching methods									
Assessment method	Evaluation of the week job card or required documents								
Symbol of learning outcome	Learning outcomes							Reference to the learning outcomes for the field of study	
LO1	is ready to follow the rules of professional ethics; is able to communicate with various groups of recipients and lead discussions on topics in the field of automatic control and robotics							AR2_K07 AR2_U08	
LO2	is ready for a thorough analysis of the content received in the practical sphere and for their critical evaluation							AR2_K01	
LO3	is ready to think and act in an entrepreneurial manner in terms of the implementation of practical tasks and the implementation of specific professional roles							AR2_K05	
LO4	is ready to use the opinions of experts and recognize the importance of knowledge in the field of technical sciences in solving and implementing practical tasks							AR2_K02	
Symbol of learning outcome	Methods of assessing the learning outcomes							Type of tuition during which the outcome is assessed	
LO1	Evaluation of the week job card or required documents								
LO2	Evaluation of the week job card or required documents								
LO3	Evaluation of the week job card or required documents								
LO4	Evaluation of the week job card or required documents								
Calculation	Student workload (in hours)							No. of hours	
	Practical classes supervised by the training supervisor							50	
							TOTAL		50
Quantitative indicators							Hours	ECTS	
Student workload - activities that require direct teacher participation							50	2	
Student workload - practical activities							50	2	
Basic references	1. Olejnik A., Nauka i praktyka - staże zawodowe w przedsiębiorstwach. Oficyna Wydawnicza Politechniki Opolskiej, Opole, 2011.								
Supplementary references	1. Oleksyn T., Zarządzanie kompetencjami: teoria i praktyka. Oficyna a Wolters Kluwer business, Warszawa, 2010.								
Organisational unit conducting	Katedra Automatyki i Robotyki							Date of issuing the programme	

the course		
Author of the programme	dr inż. Adam Kotowski	2019-09-23