| **Bialystok University of Technology** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Field of study | **Automatic Control and Robotics** | | | | | | | Degree level and programme type | **full-time Bachelor's degree** |
| Specjalization / diploma path | **common subject** | | | | | | | Study profile | **general academic** |
| Course name | **Mathematics II** | | | | | | | Course code | **MYARS02001** |
| | | | | | | | | Course type | **obligatory** |
| Forms and number of hours of tuition | L | C | LC | P | SW | FW | S | Semester | **2** |
| | **60** | **45** | **0** | **0** | **0** | **0** | **0** | No. of ECTS credits | **8** |
| Entry requirements | Mathematics I | | | | | | | | |
| Course objectives | Acquaintance with differential and integral calculus of multivariable functions and its applications. Understanding how to solve ordinary differential equations of the n-th order using classical and operator methods. Acquainting with properties of Fourier and Laplace transforms. Acquaintance with the basics of probability and estimation methods of measurement results. | | | | | | | | |
| Course content | Lecture and classes: Differential calculus of functions of several variables: Directional derivative, rotation, divergence, extremes of functions of several variables. The integral of functions of two variables. Jacobian. Change of variables in double integral. Linear integral. Differential equations of the first order. Linear equations of the n-th order with constant coefficients. Functions of a complex variable. Fourier series. Fourier integral formula. Fourier transform. Laplace transform. The operator method of solving differential equations of the n-th order. Probability. Bayes Theorem. Continuous and discrete random variable. Estimation. | | | | | | | | |
| Teaching methods | Informative-problem lecture; Classes; | | | | | | | | |
| Assessment method | Lecture: exam<br>Classes: two tests | | | | | | | | |

| Symbol of learning outcome | Learning outcomes | Reference to the learning outcomes for the field of study |
|---|---|---|
| LO1 | knows and can use selected classical methods and the operator's method for solving ordinary differential equations | AR1_W02 AR1_U02 |
| LO2 | understands and can use basic methods and tools of differential and integral calculus of functions of two variables used in engineering calculations | AR1_W02 AR1_U02 |
| LO3 | has knowledge of the basics of probability theory and basics of estimation | AR1_W02 AR1_U02 |
| LO4 | is ready for critical assessment of possessed knowledge and self-study | AR1_K01 |

| 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 | 60 |
| | Classes attendance | 45 |
| | Preparation for the lecture exam; participation in the exam | 49 |
| | Preparation for classes | 32 |
| | 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 | 112 | 4,5 |
| Student workload - practical activities | 91 | 3,6 |

| | | |
|---|---|---|
| Basic references | 1. McQuarrie D. A., Mathematical methods for scientists and engineers. University Science Books, 2003.<br>2. Swokowski E. W., Calculus with analytic geometry.<br>3. Zill D. G., Differential equations. Thomson, 2005. | |
| Organisational | Katedra Automatyki i Robotyki | Date of issuing the programme |

| | | |
|---|---|---|
| unit conducting the course | | |
| Author of the programme | dr hab. Ewa Pawłuszewicz, 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** |
| Specjalization / diploma path | **common subject** | | | | | | | Study profile | **general academic** |
| Course name | **Physics** | | | | | | | Course code | **MYARS02002** |
| | | | | | | | | Course type | **obligatory** |
| Forms and number of hours of tuition | L | C | LC | P | SW | FW | S | Semester | **2** |
| | **30** | **30** | **0** | **0** | **0** | **0** | **0** | No. of ECTS credits | **5** |
| Entry requirements | Mathematics I | | | | | | | | |
| Course objectives | Knowledge and understanding of the basic laws of the classical physics and selected elements of the modern physics. Acquiring the skills to solve the physics problems. | | | | | | | | |
| Course content | Lecture: 1. Basic laws of classical mechanics. Inertial and non-inertial frames. Galilean transformation. The law of universal gravitation. 2. Harmonic vibrations. Damped vibrations. Forced vibrations. 3. Mechanical waves, acoustic waves. Wave interference. Doppler effect. 4. Geometric and wave optics. 5. Electricity and magnetism. Maxwell's equations. Electromagnetic waves. 6. Basics of modern physics. Perfect black body, external photoelectric effect, Compton effect. Bohr Atomic Model. Wave-particle duality. Classes: Solving problems in the field of classical mechanics, geometric and wave optics, wave and vibrating motion, electricity and magnetism. | | | | | | | | |
| Teaching methods | Informative-problem lecture; Classes; | | | | | | | | |
| Assessment method | Lecture: exam<br>Classes: two tests | | | | | | | | |

| Symbol of learning outcome | Learning outcomes | Reference to the learning outcomes for the field of study |
|---|---|---|
| LO1 | knows basic laws and principles of classical and modern physics | AR1_W02 |
| LO2 | knows basic methods of solving typical physical problems | AR1_W02 |
| LO3 | knows how to analyze problems in classical physics, find and present their solutions based on acquired knowledge | AR1_U01 |
| LO4 | can skilfully use the literature on a particular issue | 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 | 30 |
| | Classes attendance | 30 |
| | Preparation for the lecture exam; participation in the exam | 33 |
| | Preparation for classes | 21 |
| | Preparation for classes completion | 6 |
| | Participation in teacher-student sessions related to the module subject | 5 |
| | TOTAL | 125 |

| Quantitative indicators | Hours | ECTS |
|---|---|---|
| Student workload - activities that require direct teacher participation | 67 | 2,7 |
| Student workload - practical activities | 62 | 2,5 |

| | |
|---|---|
| Basic references | 1. Resnick R, Halliday D., Fizyka1, Fizyka 2. PWN, Warszawa 1999.<br>2. Feynman R. P., Leighton R. B., Sands M., Feynmana wykłady z fizyki. T1 - T3, PWN, Warszawa, 2014.<br>3. Resnick R, Halliday D., Walker J., Podstawy fizyki. T1 - T5, PWN, Warszawa 2015. |
| Supplementary references | 1. Resnick R., Halliday D., Walker J., Podstawy fizyki. Zbiór zadań. PWN, Warszawa 2005.<br>2. Kalisz J., Massalska M., Massalski J. Zbiór zadań z fizyki z rozwiązaniami. PWN, Warszawa 1975. |

| | | |
|---|---|---|
| Organisational unit conducting the course | Katedra Automatyki i Robotyki | Date of issuing the programme |
| Author of the programme | dr Maciej Ciężkowski | 2019-09-23 |

| **Bialystok University of Technology** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Field of study | **Automatic Control and Robotics** | | | | | | | Degree level and programme type | **full-time Bachelor's degree** |
| Specjalization / diploma path | **common subject** | | | | | | | Study profile | **general academic** |
| Course name | **Technical mechanics** | | | | | | | Course code | **MYARS02003** |
| | | | | | | | | Course type | **obligatory** |
| Forms and number of hours of tuition | L | C | LC | P | SW | FW | S | Semester | **2** |
| | **30** | **30** | **15** | **0** | **0** | **0** | **0** | No. of ECTS credits | **6** |
| Entry requirements | Mathematics I | | | | | | | | |
| Course objectives | Presentation of methods used for kinematic and dynamic analysis of the system of points and rigid bodies; ability to apply the principles of kinematics and dynamics to analyze the system of points and a rigid body; Acquisition of basic knowledge, skills for modeling and dimensioning of mechanical systems and structural elements subjected to static and dynamic loads. | | | | | | | | |
| Course content | Lecture: Basic concepts and principles of Newton's mechanics. Point kinematics: position, velocity and acceleration in rectilinear motion; rectangular, tangential and normal components of curvilinear motion and acceleration; Coriolis acceleration. Rigid body kinematics: translational motion; rotation about a fixed axis; general movement in the plane; instantaneous center of rotation in the plane of movement; absolute and relative speed and acceleration in flat motion; motion relative to a fixed point and Euler angles. Point and point system kinetics: equation of motion in a rectangular system; equations of motion in tangential and normal components; angular momentum; momentum and momentum principle; work of strength; kinetic energy of the material point; work and energy principle; conservative forces and potential energy; principle of energy conservation. Kinetics of rigid bodies: motion equation for a rigid body; rigid body kinetic energy; work of forces acting on a rigid body; principles of work and energy for a rigid body; power and efficiency; D 'Alembert's principle, momentum and momentum for flat rigid body; rigid body motion in three dimensions and the Euler equation; equation of gyro movement and constant gyro precession. Mechanical vibrations: free vibrations; forced vibration without damping; damped vibrations. Basic concepts and assumptions of strength of materials, internal forces, deformations and stresses, Saint-Venant's principle. Tensile and compression, allowable stress and strength conditions, straight shear, strength hypotheses, bending moments and shear forces in straight beams, bending stress, beam deflection line, torsion of prismatic rods, stability of straight rods. Laboratory: Point and rigid body dynamics. Longitudinal forces in structural bars, uniaxial tension test. | | | | | | | | |
| Teaching methods | Informative-problem lecture; Classes; Laboratory classes; | | | | | | | | |
| Assessment method | Lecture: two tests<br>Classes: two tests<br>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 understands basic concepts of classical mechanics and strength of materials and is able to use them | AR1_W02 |
| LO2 | knows the methods of solving typical problems of classical mechanics and strength of materials and structures | AR1_W02 |
| LO3 | knows how to analyze problems in the field of kinematics and dynamics of a material point and a rigid body as well as the strength of materials and structures; finds and presents solutions based on acquired knowledge | AR1_U01 |
| LO4 | can skilfully use literature on a given issue | AR1_U02 |

| Symbol of learning outcome | Methods of assessing the learning outcomes | Type of tuition during which the outcome is assessed |
|---|---|---|
| LO1 | Lecture: two tests; Classes: two tests; | W C |
| LO2 | Lecture: two tests; Classes: two tests; | W C |
| LO3 | Lecture: two tests; Classes: two tests; Laboratory: evaluation of introductory tests, reports, discussion and activity during the classes; | W C L |

| | | | |
|---|---|---|---|
| LO4 | Lecture: two tests; Classes: two tests; Laboratory: evaluation of introductory tests, reports, discussion and activity during the classes; | W C L | |
| Student workload (in hours) | | No. of hours | |
| Calculation | Lecture attendance | 30 | |
| | Classes attendance | 30 | |
| | Laboratory classes attendance | 15 | |
| | Preparation for lecture test(s) | 24 | |
| | Preparation for classes | 16 | |
| | Preparation for classes completion | 6 | |
| | Preparation for laboratory classes | 21 | |
| | Preparation for laboratory classes completion | 3 | |
| | Participation in teacher-student sessions related to the module subject | 5 | |
| | TOTAL | 150 | |
| Quantitative indicators | | Hours | ECTS |
| Student workload - activities that require direct teacher participation | | 80 | 3,2 |
| Student workload - practical activities | | 96 | 3,8 |
| Basic references | 1. Leyko J., Mechanika ogólna. T1 i T2, PWN, Warszawa 2001.<br>2. Nizioł J., Metodyka rozwiązywania zadań z mechaniki. WNT, Warszawa 2002<br>3. Królikowski W., Rubinowicz W., Mechanika teoretyczna. PWN, Warszawa 2019.<br>4. Dyląg Z., Jakubowicz A., Orłoś Z., Wytrzymałość Materiałów t. I, II, WNT, W-wa 2007.<br>5. Niezgodziński M., Niezgodziński T., Zadania z wytrzymałości materiałów, WNT, Warszawa, 2016. | | |
| Supplementary references | 1. Landau Lew D., Lifszyc J., Mechanika. PWN, Warszawa 2007.<br>2. Meriam JL, Kraige LG., Engineering Mechanics: Dynamics. John Wiley & Sons, 2012.<br>3. Patnaik S., Hopkins D., Strength of Materials, A New Unified Theory for the 21 Century, Elsevier, 2004. | | |
| Organisational unit conducting the course | Katedra Mechaniki i Informatyki Stosowanej | Date of issuing the programme | |
| Author of the programme | dr hab. inż. Dariusz Perkowski, 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** |
| Specjalization / diploma path | **common subject** | | | | | | | Study profile | **general academic** |
| Course name | **Electrotechnics and electronics** | | | | | | | Course code | **MYARS02004** |
| | | | | | | | | Course type | **obligatory** |
| Forms and number of hours of tuition | L | C | LC | P | SW | FW | S | Semester | **2** |
| | **30** | **30** | **15** | **0** | **0** | **0** | **0** | No. of ECTS credits | **6** |
| Entry requirements | Mathematics I | | | | | | | | |
| Course objectives | Presentation of knowledge about concepts in the scope of electrical engineering such as: source and receiver of electricity. Defining of the basic principles of electrical engineering. Definition of electrical quantities reflecting the steady state in DC and AC circuits. Discussion of the principle of operation basic DC and AC electric machines and chosen power electronic systems. Acquiring the ability to perform measurements of electrical quantities in selected systems, presenting the obtained results in numerical and graphical form as well as making their interpretation and drawing conclusions. | | | | | | | | |
| Course content | Lecture: Basic concepts and rights of electrical engineering. DC and AC circuits. Power and electrical energy. Electromagnetism. Electrcal machines of AC and DC. Structure of electric drive. Power converters of AC/DC, DC/DC and DC/AC. Integrated circuits, operational amplifiers. Classes: Calculation of electrical quantities in DC and AC circuits of single-phase and three-phase. Phase of currents and voltages diagrams. Design of power supplies. Laboratory: Measurements of basic electrical quantities in DC and single-phase AC circuits. Study of diode and thyristor rectifiers with various types of filters. Investigation of DC/AC and DC/DC converters. | | | | | | | | |
| Teaching methods | Informative-problem lecture; Classes; Laboratory classes; | | | | | | | | |
| Assessment method | Lecture: exam<br>Classes: two tests<br>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 understands the basics of electric circuits and can apply this knowledge in calculations | | | | | | | | AR1_W06 AR1_U01 |
| LO2 | knows and understands the construction and principles of operation of basic electrical and electronic devices | | | | | | | | AR1_W06 |
| LO3 | is able to take measurements and calculates of electric quantities characterizing the operation of electrical and electronic systems | | | | | | | | AR1_W06 AR1_U04 |
| LO4 | is able to take measurements of electrical quantities and correctly develops measurement results and draws the right conclusions | | | | | | | | AR1_W06 AR1_U04 |
| LO5 | is able to take measurements of electrical quantities and correctly develops measurement results and draws the right conclusions | | | | | | | | AR1_W10 AR1_U11 AR1_U12 |
| 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; | | | | | | | | W |
| LO3 | Classes: two tests; Laboratory: evaluation of introductory tests, reports, discussion and activity during the classes; | | | | | | | | C L |
| LO4 | Laboratory: evaluation of introductory tests, reports, discussion and activity during the classes; | | | | | | | | L |
| LO5 | Laboratory: evaluation of introductory tests, reports, discussion and activity during the classes; | | | | | | | | L |
| Student workload (in hours) | | | | | | | | | No. of hours |
| Calculation | Lecture attendance | | | | | | | | 30 |
| | Classes attendance | | | | | | | | 30 |
| | Laboratory classes attendance | | | | | | | | 15 |
| | Preparation for the lecture exam; participation in the exam | | | | | | | | 26 |

| | | |
|---|---|---|
| | Preparation for classes | 16 |
| | Preparation for classes completion | 6 |
| | Preparation for laboratory classes | 19 |
| | Preparation for laboratory classes completion | 3 |
| | Participation in teacher-student sessions related to the module subject | 5 |
| | TOTAL | 150 |

| Quantitative indicators | Hours | ECTS |
|---|---|---|
| Student workload - activities that require direct teacher participation | 82 | 3,3 |
| Student workload - practical activities | 94 | 3,8 |

| | |
|---|---|
| Basic references | 1. Hempowicz P. i inni: Elektrotechnika i elektronika dla nieelektryków, WNT, Warszawa, 2009.<br>2. Opydo W. Elektrotechnika i elektronika dla studentów wydziałów nieelektrycznych. WPP, Poznań, 2005.<br>3. Bolkowski St., Brociek W., Rawa H., Teoria obwodów elektrycznych. Zadania. Wydanie: 6, WNT, Warszawa 2017.<br>4. Lipka J. i in., Laboratorium podstaw elektrotechniki dla mechaników. Wydawnictwo PW, 2004.<br>5. Kaźmierkowski M.P., Matysik J., Podstawy elektroniki i energoelektroniki. Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2004. |
| Supplementary references | 1.Praca zbiorowa pod redakcją J. Makala: Zadania z podstaw elektrotechniki. Wyd. PB, Białystok 2006.<br>2. Alexander Ch., Sadiku M., Fundamental of electric circuits. Prentice Hall 2012.<br>3. Bolkowski S. Elektrotechnika. WSiP, Warszawa, 2005.<br>4.Horowitz P., Hill W., Sztuka elektroniki. Cz. 1 i 2 Wydaw. Komunikacji i Łączności, Warszawa 2006.<br>5. Tietze U., Schenk Ch., Układy półprzewodnikowe, Wydaw. Komunikacji i Łączności, Warszawa 2009. |

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|---|---|---|
| Organisational unit conducting the course | Katedra Energoelektroniki i Napędów Elektrycznych | Date of issuing the programme |
| Author of the programme | dr inż. Antoni Bogdan | 2019-09-23 |

| **Bialystok University of Technology** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Field of study | **Automatic Control and Robotics** | | | | | | | Degree level and programme type | **full-time Bachelor's degree** |
| Specjalization / diploma path | **common subject** | | | | | | | Study profile | **general academic** |
| Course name | **Programming in C** | | | | | | | Course code | **MYARS02005** |
| | | | | | | | | Course type | **obligatory** |
| Forms and number of hours of tuition | L | C | LC | P | SW | FW | S | Semester | **2** |
| | **15** | **0** | **0** | **30** | **0** | **0** | **0** | No. of ECTS credits | **3** |
| Entry requirements | Operating systems: Linux and Android | | | | | | | | |
| Course objectives | Gaining knowledge of basic concepts of structural programming to the extent necessary to understand the principles of creating and functioning of application software. Gaining practical skills in writting the programs in a high-level language, which will create the basis for self-expansion and use of acquired knowledge in practice. | | | | | | | | |
| Course content | Lecture: Basic concepts and definitions used in programming. The structure of the program in C. Instructions. Standard input / output. Variables: types, declaration, values. Operations and operators. Expressions. Preprocessor, constants and macrodefinitions. Conditional instructions. Loops. Functions, parameter transfer. Visibility of variables. Recursion. Operations on different types of files. Output formatting. Processing of input data. Pointer type, dynamic variables and memory management. Dynamic data structures. Project: Programming environment. Program structure in C language, exemplary program. Input / output, assignment and modification operations of the variable value. Conditional instruction, program with branches. Creating a loop. Using one-dimensional tables. Application of the functions. File processing. Processing of multidimensional arrays. Use of complex types. Implementation of dynamic structure processing operations. | | | | | | | | |
| Teaching methods | Informative-problem lecture; Project classes; | | | | | | | | |
| Assessment method | Lecture: one test<br>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 basic techniques of designing and structural programming of simple applications | AR1_W04 |
| LO2 | knows basic programming constructions | AR1_W04 |
| LO3 | is able to write a program in C language based on prepared assumptions | AR1_U03 AR1_U06 |
| LO4 | is able to apply appropriate programming techniques to implement the program | AR1_U03 |
| LO5 | is able to test the program and detect and neutralize the cause of the program's malfunctioning | AR1_U03 AR1_U04 |

| 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 |
| LO5 | 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) | 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. Kernighan B.W., Ritchie D.M., The C Programming Language, 2nd edition, Prentice Hall, 1988 (Język ANSI C. WNT, Warszawa 2004; Język ANSI C. Programowanie, Helion, Warszawa 2010).<br>2. Prata S., Język C. Szkoła programowania. Helion, Gliwice 2016.<br>3. Kochan S.G., Język C. Kompendium wiedzy. Helion, Gliwice 2015. | | |
| Supplementary references | 1. Brookshear G.R., Informatyka w ogólnym zarysie, WNT, Warszawa 2003.<br>2. Aho A., Ullman J.D., Wykłady z informatyki z przykładami w języku C, Helion, Gliwice 2003.<br>3. Lippman S.B., Podstawy języka C++, Wydawnictwo 3, WNT, Warszawa 2000. | | |
| 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 | |

| **Bialystok University of Technology** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Field of study | **Automatic Control and Robotics** | | | | | | | Degree level and programme type | **full-time Bachelor's degree** |
| Specjalization / diploma path | **common subject** | | | | | | | Study profile | **general academic** |
| Course name | **Foreign language I English** | | | | | | | Course code | **MYARS02006** |
| | | | | | | | | Course type | **elective** |
| Forms and number of hours of tuition | L | C | LC | P | SW | FW | S | Semester | **2** |
| | **0** | **30** | **0** | **0** | **0** | **0** | **0** | No. of ECTS credits | **2** |
| Entry requirements | Certified knowled of English at level B1 | | | | | | | | |
| Course objectives | Repetition and consolidation of the basic principles of English grammar. Learning the correct self-presentation in speech and writing. Ability to communicate verbal in an academic environment. Using the basic terminology in the field of natural and mathematical sciences. | | | | | | | | |
| Course content | Topics: Systems. Processes. Events. Basic technical and mathematical concepts in the field of electronics and electrical engineering. Grammar: General repetition and consolidation of language skills, lexis and grammar in the B1 level range. Sentences relative clauses. Imperative form of the verb - commands / instructions. Predicting the future: will probably / certainly / possibly + verb. Passive voice in the description of the process. The order of the actions - first / then / next / finally. Creating questions. Conditional sentences type 1 and 2. The sequence of events - first / then / next / after / as soon as / as a result / finally etc. | | | | | | | | |
| Teaching methods | Classes; | | | | | | | | |
| Assessment method | Evaluation of inter-semester tests; mofular tests, written and oral statements, written and oral homeworks | | | | | | | | |

| Symbol of learning outcome | Learning outcomes | Reference to the learning outcomes for the field of study |
|---|---|---|
| LO1 | has basic knowledge of English grammar | AR1_U10 |
| LO2 | can acquire basic information from foreign language literature | AR1_U10 |
| LO3 | has vocabulary to describe basic issues related to the studied language | AR1_U10 |
| LO4 | speaks English sufficiently to communicate in typical situations | AR1_U10 |
| LO5 | can present in a verbal and written form his/her student profile, university and the direction in which he/she studies | AR1_U10 |

| Symbol of learning outcome | Methods of assessing the learning outcomes | Type of tuition during which the outcome is assessed |
|---|---|---|
| LO1 | Evaluation of inter-semester tests; mofular tests, written and oral statements, written and oral homeworks; | C |
| LO2 | Evaluation of inter-semester tests; mofular tests, written and oral statements, written and oral homeworks; | C |
| LO3 | Evaluation of inter-semester tests; mofular tests, written and oral statements, written and oral homeworks; | C |
| LO4 | Evaluation of inter-semester tests; mofular tests, written and oral statements, written and oral homeworks; | C |
| LO5 | Evaluation of inter-semester tests; mofular tests, written and oral statements, written and oral homeworks; | C |

| Student workload (in hours) | | No. of hours | |
|---|---|---|---|
| Calculation | Classes attendance | 30 | |
| | Preparation for classes | 9 | |
| | Preparation for classes completion | 6 | |
| | 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. Bonamy D., Technical English 3, Pearson Longman, 2011.<br>2. Fisiak J., Adamska-Sałaciak A., Idzikowski M., Jagła E., Jankowski M., Lew R., Słownik współczesny angielsko-polski polsko-angielski. Pearson Longman, 2006.<br>3. Hewings M., Advanced Grammar in Use. Cambridge University Press, 2005. | | |
| Supplementary references | 1. Bonamy D., Technical English 2. Pearson Longman, 2008.<br>2. Bonamy D., Technical English 4. Pearson Longman, 2011.<br>3. Ibbotson M., Professional English in Use - Engineering, Cambridge University Press, 2009.<br>4. McCarthy M., O'Dell F., Academic Vocabulary in Use, Cambridge University Press, 2016.<br>5. Downes C., Cambridge English for Job Hunting, Cambridge University Press, 2008. | | |
| Organisational unit conducting the course | Studium Języków Obcych | Date of issuing the programme | |
| Author of the programme | mgr Wojciech Rogalski | 2019-09-23 | |

| **Bialystok University of Technology** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Field of study | **Automatic Control and Robotics** | | | | | | | Degree level and programme type | **full-time Bachelor's degree** |
| Specjalization / diploma path | **common subject** | | | | | | | Study profile | **general academic** |
| Course name | **Foreign language I Russian** | | | | | | | Course code | **MYARS02007** |
| | | | | | | | | Course type | **elective** |
| Forms and number of hours of tuition | L | C | LC | P | SW | FW | S | Semester | **2** |
| | **0** | **30** | **0** | **0** | **0** | **0** | **0** | No. of ECTS credits | **2** |
| Entry requirements | Certified knowled of Russian at level B1 | | | | | | | | |
| Course objectives | Repetition and consolidation of basic principles of Russian grammar. Learning the correct self-presentation in speech and writing. Ability to communicate verbal in an academic environment. Using basic terminology in the field of natural sciences, mathematics and technical sciences. | | | | | | | | |
| Course content | Topics: Lifestyle. Conflict of generations. Academic environment. Teaching of foreign languages in Poland. Passions. Interests in the past and today. Specialist part: basic mathematical, physical and chemical concepts. Grammatical issues: Forms of personal verbs in all tenses and modes. Verbs made and imperfect, reflexive and irregular. Declension forms of nouns. Generic tips of adjectives. Main and order numerals. Pronouns. | | | | | | | | |
| Teaching methods | Classes; | | | | | | | | |
| Assessment method | Evaluation of inter-semester tests; mofular tests, written and oral statements, written and oral homeworks | | | | | | | | |

| Symbol of learning outcome | Learning outcomes | Reference to the learning outcomes for the field of study |
|---|---|---|
| LO1 | has basic knowledge of Russian grammar | AR1_U10 |
| LO2 | can acquire basic information from foreign literature | AR1_U10 |
| LO3 | has vocabulary to describe basic issues related to the studied direction | AR1_U10 |
| LO4 | uses the Russian language to the extent sufficient for communication in typical situations | AR1_U10 |
| LO5 | can present in the oral and written form his/her student profile, university and the direction in which he/she studies | AR1_U10 |
| LO6 | is ready to... | |

| Symbol of learning outcome | Methods of assessing the learning outcomes | Type of tuition during which the outcome is assessed |
|---|---|---|
| LO1 | Evaluation of inter-semester tests; mofular tests, written and oral statements, written and oral homeworks; | C |
| LO2 | Evaluation of inter-semester tests; mofular tests, written and oral statements, written and oral homeworks; | C |
| LO3 | Evaluation of inter-semester tests; mofular tests, written and oral statements, written and oral homeworks; | C |
| LO4 | Evaluation of inter-semester tests; mofular tests, written and oral statements, written and oral homeworks; | C |
| LO5 | Evaluation of inter-semester tests; mofular tests, written and oral statements, written and oral homeworks; | C |

| Student workload (in hours) | | No. of hours |
|---|---|---|
| Calculation | Classes attendance | 30 |
| | Preparation for classes | 9 |
| | Preparation for classes completion | 6 |
| | 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. Cieplicka M.,Torzewska W., Русский язык. Kompendium tematyczno-leksykalne 1. Wagros, Poznań, 2007.<br>2. Pado A., Start.ru 2. WSiP, Warszawa, 2006.<br>3. Milczarek W., Język rosyjski od A do Z. Repetytorium. Kram, Warszawa, 2007. | | |
| Supplementary references | 1. Kowalska N., Samek D., Praktyczna gramatyka języka rosyjskiego. REA, Warszawa, 2004.<br>2. Materiały z rosyjskojęzycznych portali internetowych, prasy i książek.<br>3. Samek D., Rozmówki polsko-rosyjskie. REA, Warszawa, 2009.<br>4. Słownik naukowo-techniczny rosyjsko-polski. Wydawnictwa Naukowo-Techniczne, Warszawa, 1999. | | |
| Organisational unit conducting the course | Studium Języków Obcych | Date of issuing the programme | |
| Author of the programme | mgr Irena Kamińska | 2019-09-23 | |

| **Bialystok University of Technology** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Field of study | **Automatic Control and Robotics** | | | | | | | Degree level and programme type | **full-time Bachelor's degree** |
| Specjalization / diploma path | **common subject** | | | | | | | Study profile | **general academic** |
| Course name | **Foreign language I German** | | | | | | | Course code | **MYARS02008** |
| | | | | | | | | Course type | **elective** |
| Forms and number of hours of tuition | L | C | LC | P | SW | FW | S | Semester | **2** |
| | **0** | **30** | **0** | **0** | **0** | **0** | **0** | No. of ECTS credits | **2** |
| Entry requirements | Certified knowled of German at level B1 | | | | | | | | |
| Course objectives | Repetition and consolidation of basic principles of Russian grammar. Learning the correct self-presentation in speech and writing. Ability to communicate verbal in an academic environment. Using basic terminology in the field of natural sciences, mathematics and technical sciences. | | | | | | | | |
| Course content | Topics: Higher education and student life - academic vocabulary, preparation of the student's self-presentation with information about the university and the field of study. Specialist part: basic mathematical, physical and chemical concepts. Grammar: repeating the structure of simple and complex sentences; occasional sentences of effect; permanent noun-verb relationships; repetition of grammatical tenses. | | | | | | | | |
| Teaching methods | Classes; | | | | | | | | |
| Assessment method | Evaluation of inter-semester tests; mofular tests, written and oral statements, written and oral homeworks | | | | | | | | |

| Symbol of learning outcome | Learning outcomes | Reference to the learning outcomes for the field of study |
|---|---|---|
| LO1 | has basic knowledge of German grammar | AR1_U10 |
| LO2 | can acquire basic information from foreign language literature | AR1_U10 |
| LO3 | has vocabulary to describe basic issues related to the studied direction | AR1_U10 |
| LO4 | uses German language to the extent sufficient for communication in typical situations | AR1_U10 |
| LO5 | can present in the oral and written form his/her student profile, university and the direction in which he/she studies | AR1_U10 |

| Symbol of learning outcome | Methods of assessing the learning outcomes | Type of tuition during which the outcome is assessed |
|---|---|---|
| LO1 | Evaluation of inter-semester tests; mofular tests, written and oral statements, written and oral homeworks; | C |
| LO2 | Evaluation of inter-semester tests; mofular tests, written and oral statements, written and oral homeworks; | C |
| LO3 | Evaluation of inter-semester tests; mofular tests, written and oral statements, written and oral homeworks; | C |
| LO4 | Evaluation of inter-semester tests; mofular tests, written and oral statements, written and oral homeworks; | C |
| LO5 | Evaluation of inter-semester tests; mofular tests, written and oral statements, written and oral homeworks; | C |

| Student workload (in hours) | | No. of hours |
|---|---|---|
| Calculation | Classes attendance | 30 |
| | Preparation for classes | 9 |
| | Preparation for classes completion | 6 |
| | 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. Perlmann-Balme, Schwalb M., Matussek S. M., Sicher! Deutsch als Fremdsprache: Niveau B2: Kursbuch und Lektion 1-12, München, Hueber Verlag, 2014.<br>2. Maria Steinmetz, Heiner Dintera, Deutsch für Ingenieure, Springer Vieweg 2014.<br>3. Kuhn Ch., Niemann R. M., Winzer-Kiontke B., studio d - Die Mittelstufe B2, Cornelsen Verlag 2010.<br>4. Hagner V., Schlüter S., Im Beruf Kurs- und Arbeitsbuch, Hueber Verlag 2014. | |
| Supplementary references | 1. Omelianiuk W., Ostapczuk H., Sach- und Fachtexte auf Deutsch, Teil 2, Politechnika Białostocka, Białystok, 2010.<br>2. Zespół red. Sokołowska M., Bender A., Żak K., Słownik naukowo-techniczny niemiecko-polski, Wydawnictwa Naukowo-Techniczne 2007.<br>3. Materiały własne prowadzącego (adaptowane i opracowane teksty z literatury fachowej oraz z Internetu). | |
| Organisational unit conducting the course | Studium Języków Obcych | Date of issuing the programme |
| Author of the programme | mgr Wioletta Omelianiuk | 2019-09-23 |