

Course Title	Actuators in Control Systems - laboratory, PG_00047582
ECTS points/workload	1.0
Level	first-cycle studies
Form of Instruction	Laboratory
Form of Examination	assessment
Description	To get to know basic parameters and features of actuators - i.e. the commutateds DC engines and BLDC engines, stepping motors and relays (contact and non contact switching devices) - and methods of their measurement .
Literature	1. Jerzy Kostro "Elementy, urządzenia i układy automatyki" - Czytelnia na Wydziale ETI 2. Silniki krokowe i sterowniki silników krokowych. Instrukcja obsługi sterownika SMC64 - opis w sieci <a href="http://www.wobit.com.pl">http://www.wobit.com.pl</a> . 3. Dane katalogowe przekaźników półprzewodnikowych SSR ( <a href="http://sharp-world.com">http://sharp-world.com</a> ; <a href="http://www.irf.com">http://www.irf.com</a> )

Course Title	Actuators in in Automatic Control, PG_00047564
ECTS points/workload	3.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	assessment
Description	The aim is to education specialists in the field of actuators in control systems, as well as preparing them for industrial jobs. The aim is also to prepare to take up studies on the second stage.
Literature	1. Jerzy Kostro, "Elementy, urządzenia i układy automatyki" - Czytelnia na Wydziale ETI 2. Zbigniew Zajda, Ludwik Żebrowski, "Urządzenia i układy automatyki" - Czytelnia na Wydziale ETI 3. Takashi Kenjo, "Electric Motors and Their Control : An Introduction" - Czytelnia na Wydziale Elektrotechniki i Automatyki

Course Title	Analog Control - laboratory, PG_00047591
ECTS points/workload	2.0
Level	first-cycle studies
Form of Instruction	Laboratory
Form of Examination	assessment
Description	The aim of the course is to familiarize with the practical aspects of control theory
Literature	Course book of Analog Control laboratory.

Course Title	Analog Control, PG_00047575
ECTS points/workload	3.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	exam
Description	Introduction of linear analysis using state space methods. Introduction of nonlinear system analysis (describing function, phase plane method).
Literature	J. Nowakowski "Podstawy automatyki" tom 2 skrypt PG

Course Title	Artificial Intelligence - laboratory, PG_00047589
ECTS points/workload	1.0
Level	first-cycle studies
Form of Instruction	Laboratory
Form of Examination	assessment
Description	Understanding by the students of the basic branches of artificial intelligence with respect to their applications in automation and solution of selected problems during laboratory classes
Literature	Jędruch W.: Sztuczna inteligencja: Materiały do wykładu, 220 str., Gdańsk, 2010  Russel S., Norvig P.: Artificial Intelligence, Prentice-Hall, London. 2009 Rutkowski L.: Metody i techniki sztucznej inteligencji, Wydawnictwo Naukowe PWN, Warszawa 2009.dd

Course Title	Artificial Intelligence in Automatic Control, PG_00047568
ECTS points/workload	3.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	exam
Description	The lecture provides the basic knowledge of artificial intelligence methods
Literature	Russel S., Norvig P.: Artificial Intelligence, Prentice-Hall, London. 2009

Course Title	Autonomous Systems of Expertise and Data Mining, PG_00047703
ECTS points/workload	2.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	assessment
Description	The aim of the course is to understand the construction and operation of autonomous systems and data mining expertise. In the lecture part of the course, students learn the different components of solutions based on modern systems analysis of large volumes of data. Theoretical considerations are enriched practical knowledge acquired from the laboratory classes.
Literature	Kowalczyk, Z., Diagnosis of Processes and Systems. PWNT, Gdańsk (2009)  Jared Dean, Big Data, Data Mining and Machine Learning BCS Learning & Development Limited, Big Data: Opportunities and Challenges Keith R Holdaway, Think Bigger: Developing a Successful Big Data Strategy for Your Business Harness Oil and Gas Big Data with Analytics: Mark Van Rijmenam, Exploration and Production with Data Driven Models

Course Title	Basic Math, PG_00047522
ECTS points/workload	3.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	exam
Description	Students obtain competence in the range of using methods of basic mathematics.
Literature	Wiekł B. (red), „Matematyka. Podstawy z elementami matematyki wyższej”, Wydawnictwo Politechniki Gdańskiej

Course Title	Basics of Computer Control, PG_00047702
ECTS points/workload	4.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	exam
Description	Mastering the engineering knowledge of computer control of real-time processes.
Literature	T. Kaczorek: "Teoria układów regulacji automatycznej" WNT 1977

Course Title	Basics of Cybernetics, PG_00047709
ECTS points/workload	2.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	assessment
Description	<p>The aim of the course is to acquaint students with the cybernetics. Cybernetics analyzes (finds) similarities (homologies) between the principles of action of living organisms, social systems (community) and machinery (holism), reveals the general laws common to different teachings and enables the transfer of these rights from one area to another; therefore cybernetics science is interdisciplinary, and it finds many practical applications.</p>
Literature	<ol style="list-style-type: none"> <li>1. Brooks, Rodney A. (1991). "Intelligence without representation". Artificial Intelligence 47 (1-3): 139-59.</li> <li>2. Jump upParker, Lynne E. (1995). "On the design of behavior-based multi-robot teams". Advanced Robotics 10 (6): 547-78.</li> <li>3. Arkin Ronald C. (1998). "Behavior-Based Robotics" MIT Press Cambridge, MA, USA</li> <li>4. Minsky Marvin (1974). "A Framework for Representing Knowledge"</li> <li>5. Sowa John F. (1987). "Semantic Networks"</li> </ol>

Course Title	Basics of Mechanics, PG_00047526
ECTS points/workload	3.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	assessment
Description	To familiarize students with the necessary knowledge of the modeling in mechanics, the main concepts and theorems of statics. The introduction of methods for modeling sliding friction and rolling resistance. Get to know the stress-strain relationship, and the concepts of allowable stress in tensile elements, compression, bending and torsion. Presentation of methods of determining the stresses and line deflection of beams, for statically determinable and indeterminable systems. Introduction of the basic concepts and theorems kinematics and dynamics of mechanical systems.
Literature	1. Wittbrodt E., Sawiak S.: Mechanika ogólna. Teoria i zadania. Wyd. PG, Gdańsk 2005 2. Sawiak S., Wittbrodt E.: Mechanika. Wybrane zagadnienia. Skrypt PG, Gdańsk 2003 3. Leyko J.: Mechanika ogólna, t. I i 2, PWN, Warszawa 1980 4. Niezgodziński M.E., Niezgodziński T.: Zbiór zadań z mechaniki ogólnej, PWN, Warszawa 1997 5. Dyląg Z., Jakubowicz A., Orłowski Z.: Wytrzymałość materiałów, Warszawa WNT, t.I 1996, t.II 1997

Course Title	Basics of Programming, PG_00047377
ECTS points/workload	5.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	assessment
Description	This course is an introduction to computer programming. Its primary objective is to teach solving of programming problems and writing programs using the C++ programming language.
Literature	[1] Grębosz J., Symfonia C++ Standard (tom 1 i 2), Editions 2000, Krakow 2008.  [2] Borowiecki Piotr, Podstawy programowania - materiały do wykładu. [3] Materiały przygotowujące do laboratorium z Podstaw programowania (opracowanie zespołowe). For participants of the course, [2] and [3] are available at eNauczanie PG platform.

Course Title	Basics of Robotics - laboratory, PG_00047592
ECTS points/workload	1.0
Level	first-cycle studies
Form of Instruction	Laboratory
Form of Examination	assessment
Description	Students do exercises related to issues described during the lecture: programming of industrial robots from Kawasaki (FA06E, RS03N) and Mitsubishi (RV-12SDL), getting acquainted with image processing algorithms.
Literature	<p>1. Fiertek P., Tatara M.: Podstawy Robotyki - Laboratorium. Skrypt Politechniki Gdańskiej: 2017.</p> <p>2. Craig J.: Wprowadzenie do robotyki. Mechanika i sterowanie. Wydawnictwo Naukowo-Techniczne. Warszawa: 1993.</p> <p>3. Spong. M. W., Vidyasagar M.: Dynamika i sterowanie robotów. Wydawnictwa Naukowo-Techniczne. Warszawa: 1997.</p>

Course Title	Basics of Robotics, PG_00047578
ECTS points/workload	3.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	exam
Description	The aim of the course is introduction into the basic issues concerning stationary industrial robots such as: various divisions of robots, their tasks, construction, safety issues, methods of their study, tasks of control systems, Denavit-Hartenberg notation.
Literature	<p>1. Craig J.: Wprowadzenie do robotyki. Mechanika i sterowanie. Wydawnictwo Naukowo-Techniczne. Warszawa. 1993. 2. Spong. M. W., Vidyasagar M.: Dynamika i sterowanie robotów. Wydawnictwo Naukowo-Techniczne. Warszawa. 1997. 3. Honczarenko J.: Roboty przemysłowe. Budowa i zastosowanie. Wydawnictwo Naukowo-Techniczne. Warszawa. 2004.</p> <p>2. Spong. M. W., Vidyasagar M.: Dynamika i sterowanie robotów. Wydawnictwo Naukowo-Techniczne. Warszawa: 1997.</p> <p>3. Morecki A., Knapczyk. J.: Podstawy robotyki. Teoria i elementy manipulatorów i robotów. Wydawnictwo Naukowo-Techniczne. Warszawa: 1999.</p> <p>3. Honczarenko J.: Roboty przemysłowe. Budowa i zastosowanie. Wydawnictwo Naukowo-Techniczne. Warszawa: 2004.</p>

Course Title	BSc Diploma Project I, PG_00047943
ECTS points/workload	2.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	assessment
Description	Implementation of the diploma
Literature	<p>W.L. Brogan: Modern control theory, Prentice Hall, Englewood Cliffs, 1974.</p> <p>K.J. Astrom, B Wittenmark: Computer-controlled systems. Prentice Hall, Upper Saddle River, 1997</p> <p>B.C. Kuo: Automatic Control Systems. Prentice-Hall, Englewood Cliffs 1987</p>

Course Title	BSc Diploma Project II, PG_00048817
ECTS points/workload	13.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	assessment
Description	Preparing the student for the implementation of the diploma project, and then systematically monitoring the progress of his own work on the project, giving him advice, advice and tips. Checking the practical effects of the project work.
Literature	The literature is indicated to the student implementing the project in accordance with the subject of the project.

Course Title	BSc Diploma Seminar, PG_00047707
ECTS points/workload	2.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	assessment
Description	Preparing students for writing a thesis and its presentation. Discussion of the list of questions of the final exam.
Literature	Literature related to the topic of the thesis.

Course Title	Circuits and Signals - laboratory, PG_00047566
ECTS points/workload	1.0
Level	first-cycle studies
Form of Instruction	Laboratory
Form of Examination	assessment
Description	Equipping a student with knowledge and skills acquired in studying the basics of analogue circuits and signals. The knowledge is sought to be useful in further professional studies and practice.
Literature	J. Osiowski i J. Szabatin: Podstawy teorii obwodów, tomy I-III. WNT Warszawa 1993 (tom I i tom II) i 1995 (tom III) i wydania kolejne.

Course Title	Circuits and Signals, PG_00047549
ECTS points/workload	4.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	exam
Description	Equipping a student with knowledge and skills acquired in studying the basics of analogue circuits and signals. The knowledge is sought to be useful in further professional studies and practice.
Literature	J. Osiowski and J. Szabatin: Fundamentals of circuit theory, volumes I, II and III. WNT Warszawa 1993 (volume I and volume II) and 1995 (volume III) and subsequent editions. A. Leśnicki: Analog signal technique, volumes 1 and 2, Gdansk University of Technology Publishing House, Gdańsk 2014. C. Stefanski: Circuit and signal primer (available at <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=638">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=638</a> ) (all in Polish)



Course Title	Computer Systems Architecture - laboratory, PG_00047692
ECTS points/workload	1.0
Level	first-cycle studies
Form of Instruction	Laboratory
Form of Examination	assessment
Description	The main aim of the subject is to gain knowledge about the most common computer systems organization and basic knowledge of computer system components and principles of their operation. The knowledge is applied for designing of computer PC programs.
Literature	A. Pyrchla, B. Danowski, BIOS, Przewodnik, Helion 2007, A. S. Tanenbaum, Strukturalna organizacja systemów komputerowych, Helion 2006, R. Irvine, Asembler dla procesorów Intel, vademekum profesjonalisty, Helion 2003, Katalogi, Strony WWW

Course Title	Computer Systems Architecture, PG_00047630
ECTS points/workload	3.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	exam
Description	The aim of the course is to learn the principles of operation and construction of functional blocks and organization of computer systems
Literature	A. Skorupski, Podstawy budowy i działania komputerów, WKŁ B. Zieliński, Układy mikroprocesorowe. Przykłady rozwiązań, Helion 2002 Katalogi, strony WWW i podręczniki firmowe. Metzger P. "Anatomia PC", HELION, 2008. Niederliński A. Mikroprocesory mikrokomputery mikrosystemy. WSiP 1988. W. Komorowski, Krótki kurs architektury i organizacji komputerów, Mikom 2004

Course Title	Databases, PG_00053919
ECTS points/workload	3.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	exam
Description	<p>Main goal of the subject is to familiarize students with basic databases techniques. During course student meets basic database terms - such as data, database , DBMS, data model etc. Student gets knowledge about various data models and learns how to design data structure - especially within relational database. Additionally student learns how to use selected DBMS and learns the SQL language. Student learns how to use transactions, SQL functions, triggers and learns how to use SQL within another programming language to create data interface.</p>
Literature	<p>Davies, Database systems</p> <p>Matthews Stones, Databases and PostgreSQL</p> <p>Rumiński, Bujnowski, Skrypt do przedmiotu Bazy Danych</p>

Course Title	Digital Technology - laboratory, PG_00047557
ECTS points/workload	4.0
Level	first-cycle studies
Form of Instruction	Laboratory
Form of Examination	assessment
Description	<p>The class of logic students acquire knowledge of:</p> <ul style="list-style-type: none"> <li>- The mathematical systems used to describe iterative combination and sequence combination</li> <li>- Introduction to binary, binary, Boolean algebra arytmetyka's logical functions</li> <li>- Basic concepts, systems, systems iterative</li> <li>- Synthesis of sequential iterative and sequence</li> <li>- Synthesis of synchronous and asynchronous sequential Circuits</li> <li>- memory</li> </ul>
Literature	<p>R. F. Tinder, Engineering Digital Design J. D. Daniels, Digital Design from Zero to One Texas Instruments, Digital Design Seminar M. Barski, W. Jędruch, Digital Circuits W. Majewski, Logical Circuits Zieliński C.: Fundamentals of Digital Circuit Design, Wydawnictwo Naukowe PWN, Warsaw 2003</p>

Course Title	Digital Technology I, PG_00047528
ECTS points/workload	7.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	exam
Description	The aim of the course is to learn the mathematical description and the methods of analysis and design of digital integrated circuits
Literature	J. Kalisz Podstawy elektroniki cyfrowej, WKiŁ 1998 J. Pieńkos, J. Turczyński Układy scalone TTL w systemach cyfrowych, WKiŁ 1986 Katalogi firmowe M. Barski, W. Jędruch Układy cyfrowe, podstawy projektowania i opis w języku VHDL, Wydawnictwo Politechniki Gdańskiej 2007 T. Łuba (red.) Synteza układów cyfrowych, WKiŁ 2003 Zasoby Internetu

Course Title	Digital Technology II, PG_00047553
ECTS points/workload	1.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	assessment
Description	The aim of the course is to gain knowledge on how to describe digital circuits and methods for their design using programmable systems and VHDL language.
Literature	Katalogi firmowe M. Barski, W. Jędruch Układy cyfrowe, podstawy projektowania i opis w języku VHDL, Wydawnictwo Politechniki Gdańskiej 2007 M. Zwoliński Projektowanie układów cyfrowych z wykorzystaniem języka VHDL, WKiŁ 2007 P. Zbysiński, J. Pasierbiński Układy programowalne w praktyce, WKiŁ 2002 Zasoby Internetu

Course Title	Discrete mathematics, PG_00047546
ECTS points/workload	4.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	assessment
Description	<ul style="list-style-type: none"> <li>• Assimilation of knowledge of set theory, mathematical logic, data structures (trees) and graph theory.</li> <li>• Learning algorithms of graph coloring and searching for the shortest path in the graph.</li> </ul>
Literature	<ul style="list-style-type: none"> <li>• A.Szepietowski, Matematyka Dyskretna, Wydawnictwo Uniwersytetu Gdańskiego, Gdańsk 2006.</li> <li>• S.S. Epp, Discrete Mathematics with Applications, Brooks Cole, 2003.</li> <li>• K.A. Ross, C.R.B. Wright, Discrete Mathematics, Pearson, 2002.</li> </ul>

Course Title	Electronic Circuits - laboratory, PG_00047581
ECTS points/workload	1.0
Level	first-cycle studies
Form of Instruction	Laboratory
Form of Examination	assessment
Description	knowledge of instruments and retention of theoretical knowledge on the structure and properties of electronic systems of linear electronic circuits in the student's lab.
Literature	Guziński A: "Liniowe elektroniczne układy analogowe", WNT, 1994 Tietze U., Schenk Ch.: "Układy półprzewodnikowe", WNT2009 Sedra A.S., Smith K.C.: "Microelectronic circuits", Oxford University Press, New York, Oxford, 2004

Course Title	Electronic Circuits, PG_00047559
ECTS points/workload	3.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	assessment
Description	Knowledge of methods of analysis and design of analog electronic circuits structures based on the MOSFET, JFET and bipolar transistors.
Literature	Guziński A: "Liniowe elektroniczne układy analogowe", WNT, 1994 Tietze U., Schenk Ch.: "Układy półprzewodnikowe", WNT2009 Sedra A.S., Smith K.C.: "Microelectronic circuits", Oxford University Press, New York, Oxford, 2004

Course Title	Electronic Coupling Systems in Automatic Control, PG_00047942
ECTS points/workload	2.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	assessment
Description	The aim of the course is to familiarize students with the physics of electronic coupling systems in automation.
Literature	1. K. Suchocki, "Sensors and Transducers," vol. 1-2, Gdańsk University of Technology Publishing House 2016 2. J. Orear, "Physics," vol. 1-2, Scientific and Technical Publishing House 1993 3. P. Kowalczyk, R. Lech, W. Zieniutycz, "Basics of Electromagnetism in Tasks," Gdańsk University of Technology Publishing House 2015 4. T. Stefański, Presentations for the lecture

Course Title	Embedded Systems in Automatic Control and Robotics, PG_00049435
ECTS points/workload	2.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	assessment
Description	Presenting students modern embedded systems used in automation and robotics.
Literature	<ol style="list-style-type: none"> <li>1. Dorf R.C., Bishop R.H. Modern control systems, Addison Wesley, 1995</li> <li>2. Marwedel P., Embedded System Design, Kluwer Academic Publishers, Boston 2003, ISBN 1-4020-7690-8</li> <li>3. Olsson G., Piani G., Computer systems in automation, Prentice-Hall, Londyn New York 1992</li> <li>4. Ting-pat So A., Intelligent building systems, Kluwer Academic Publ., Boston London 1999</li> </ol>

Course Title	English Language I, PG_00047533
ECTS points/workload	2.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	assessment
Description	<p>Students reach B2 or C1 level of general English with the elements of engineering vocabulary and topic areas. The course additionally covers basic aspects of the specialist language relevant to the field of study.</p> <p>It is concluded with the ACERT exam.</p>
Literature	<ol style="list-style-type: none"> <li>1. Cotton D., Falvey D., Kent S., New Language Leader Intermediate, Pearson 2013</li> <li>2. Cotton D., Falvey D., Kent S., New Language Leader Upper-Intermediate, Pearson 2014</li> <li>3. Cotton D., Falvey D., Kent S., Lebeau I., Rees G., New Language Leader Advanced, Pearson 2015</li> <li>4. Ibbotson M., Professional English in Use Engineering, Cambridge 2014</li> <li>5. Vince M., Language Practice for First, Macmillan 2014</li> <li>6. Vince M., Language Practice for Advanced, Macmillan 2014</li> <li>7. Harrison M., First Testbuilder, Macmillan 2014</li> <li>8. French A., Advanced Testbuilder, Macmillan 2015</li> </ol>

Course Title	English Language II, PG_00047560
ECTS points/workload	2.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	assessment
Description	Students reach B2 or C1 level of general English with the elements of engineering vocabulary and topic areas. The course additionally covers basic aspects of the specialist language relevant to the field of study. It is concluded with the ACERT exam.
Literature	<ol style="list-style-type: none"> <li>1. Cotton D., Falvey D., Kent S., New Language Leader Intermediate, Pearson 2013</li> <li>2. Cotton D., Falvey D., Kent S., New Language Leader Upper-Intermediate, Pearson 2014</li> <li>3. Cotton D., Falvey D., Kent S., Lebeau I., Rees G., New Language Leader Advanced, Pearson 2015</li> <li>4. Ibbotson M., Professional English in Use Engineering, Cambridge 2014</li> <li>5. Vince M., Language Practice for First, Macmillan 2014</li> <li>6. Vince M., Language Practice for Advanced, Macmillan 2014</li> <li>7. Harrison M., First Testbuilder, Macmillan 2014</li> <li>8. French A., Advanced Testbuilder, Macmillan 2015</li> </ol>

Course Title	English Language III, PG_00047569
ECTS points/workload	2.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	assessment
Description	Students reach B2 or C1 level of general English with the elements of engineering vocabulary and topic areas. The course additionally covers basic aspects of the specialist language relevant to the field of study. It is concluded with the ACERT exam.
Literature	<ol style="list-style-type: none"> <li>1. Cotton D., Falvey D., Kent S., New Language Leader Intermediate, Pearson 2013</li> <li>2. Cotton D., Falvey D., Kent S., New Language Leader Upper-Intermediate, Pearson 2014</li> <li>3. Cotton D., Falvey D., Kent S., Lebeau I., Rees G., New Language Leader Advanced, Pearson 2015</li> <li>4. Ibbotson M., Professional English in Use Engineering, Cambridge 2014</li> <li>5. Vince M., Language Practice for First, Macmillan 2014</li> <li>6. Vince M., Language Practice for Advanced, Macmillan 2014</li> <li>7. Harrison M., First Testbuilder, Macmillan 2014</li> <li>8. French A., Advanced Testbuilder, Macmillan 2015</li> </ol>

Course Title	English Language IV, PG_00047598
ECTS points/workload	2.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	exam
Description	Students reach B2 or C1 level of general English with the elements of engineering vocabulary and topic areas. The course additionally covers basic aspects of the specialist language relevant to the field of study. It is concluded with the ACERT exam.
Literature	<ol style="list-style-type: none"> <li>1. Cotton D., Falvey D., Kent S., New Language Leader Intermediate, Pearson 2013</li> <li>2. Cotton D., Falvey D., Kent S., New Language Leader Upper-Intermediate, Pearson 2014</li> <li>3. Cotton D., Falvey D., Kent S., Lebeau I., Rees G., New Language Leader Advanced, Pearson 2015</li> <li>4. Ibbotson M., Professional English in Use Engineering, Cambridge 2014</li> <li>5. Vince M., Language Practice for First, Macmillan 2014</li> <li>6. Vince M., Language Practice for Advanced, Macmillan 2014</li> <li>7. Harrison M., First Testbuilder, Macmillan 2014</li> <li>8. French A., Advanced Testbuilder, Macmillan 2015</li> </ol>

Course Title	Essentials of Automatics, PG_00047537
ECTS points/workload	5.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	exam
Description	Introduction of basic concepts of automatic control systems.
Literature	<p>N.S. Nise, Control Systems Engineering, Wiley, 2010.</p> <p>R.C. Dorf, R.H. Bishop, Modern Control Systems, Prentice Hall, 2008.</p> <p>F. Golnaraghi, B.C. Kuo, Automatic Control Systems, Wiley, 2009.</p>



Course Title	Ethernet and IP Networks, PG_00053920
ECTS points/workload	1.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	assessment
Description	Acquainted with the concept of Ethernet from end to end. Feasibility of the concept now and in the coming years. Acquainted with the problems of scalability, reliability, quality, manageability and offer services in Ethernet networks. Acquainted with modern IP networks solutions, migration from IPv4 to IPv6 and IPv6 protocol capabilities.
Literature	Nowicki K.: Ethernet - sieci, mechanizmy, Infotech 2006  Nowicki K., Światowiak J.: Protokoły IPv6, PG, 2002

Course Title	Fundamentals of Physics, PG_00047550
ECTS points/workload	3.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	exam
Description	Providing the student with the specialist knowledge concerning the basic rules of physics immediately relevant to the technical areas.
Literature	1. Halliday D., Resnick R., Walker J., Fundamentals of Physics  2. Collection of physics problems available at the website: <a href="http://www.mif.pg.gda.pl/zz/">www.mif.pg.gda.pl/zz/</a>

Course Title	Genetic Algorithms, PG_00047706
ECTS points/workload	3.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	exam
Description	The main goal of the subject is to acquaint students with evolutionary algorithms. The lecture covers the following issues : evolutionary optimization techniques; encoding and decoding of parameters; methods of assessment of the fitness degree; selection methods of individuals; genetic operations; replacement strategies. scaling methods; niching methods. multi-objective optimization methods
Literature	<p>Arabas J.: Wykłady z algorytmów ewolucyjnych. WNT, Warszawa 2001.</p> <p>Berg P., Singer M.: Język genów, poznawanie zasad dziedziczenia. Prószyński i S-ka, Warszawa 1997.</p> <p>Goldberg D.E.: Genetic algorithms in search, Optimisation and Machine Learning. Addison-Wesley, Massachusetts 1989.</p> <p>Michalewicz Z., Fogel D. B.: How to solve it: Modern Heuristics. 2nd edition, Springer-Verlag, Berlin 2004.</p> <p>Michalewicz Z.: Genetic Algorithms + Data Structures = Evolution Programms, Springer-Verlag, 3rd edition, Heidelberg - Berlin 1996.</p> <p>Miller R. E.: Optimization. Foundations and applications. A Wiley-Interscience Publication, John Wiley &amp; Sons, Inc. New York 2000.</p> <p>Obuchowicz A.: Evolutionary Algorithms for Global Optimization and Dynamic System Diagnosis. Lubusky Scientific Society in Zielona Góra 2003.</p> <p>Rutkowski L.: Metody i techniki sztucznej inteligencji. Wydawnictwo Naukowe PWN, Warszawa 2005.</p>

Course Title	Hypertext and Hypermedia, PG_00047378
ECTS points/workload	3.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	assessment
Description	Konwledge about key concepts of hipertext and hipermedia
Literature	<p>Bates, Ch.: XML in Theory and Practice, John Wiley &amp; Sons, 2003</p> <p>Mangano, S.: XSLT. Receptury. Helion 2007 Kurs języka HTML - poradnik webmastera: <a href="http://webmaster.helion.pl/kurshtml/">http://webmaster.helion.pl/kurshtml/</a></p> <p>Jon Duckett: HTML i CSS. Zaprojektuj i zbuduj witrynę WWW. Podręcznik Front-End Developera, Helion 2018</p>

Course Title	Integrated Decision Systems II, PG_00047710
ECTS points/workload	1.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	assessment
Description	<p>The aim of the course is to enable students to independently perform a large system project. The projects are closely related to the fusion of various kinds of measurement data and making decisions based on them.</p> <p>Student groups consist of approximately 8 people. Leader of the group is responsible for the division of labor and group management. Programming code (for different devices) is stored in a control version system.</p>
Literature	Siegwart, R., Nourbakhsh, I. R., & Scaramuzza, D. (2011). Introduction to autonomous mobile robots. MIT press.

Course Title	Integrated Decision Systems, PG_00047701
ECTS points/workload	2.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	assessment
Description	<p>The aim of the course is to enable students to independently perform a large system project. The projects are closely related to the fusion of various kinds of measurement data and making decisions based on them.</p> <p>Student groups consist of approximately 8 people. Leader of the group is responsible for the division of labor and group management. Programming code (for different devices) is stored in a control version system.</p>
Literature	Siegwart, R., Nourbakhsh, I. R., & Scaramuzza, D. (2011). Introduction to autonomous mobile robots. MIT press.

Course Title	Intelligent Robots, PG_00047699
ECTS points/workload	3.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	exam
Description	The aim of the subject is to teach students about robot navigation, algorithms of path planning and the problems of SLAM.
Literature	E. Bekir, Introduction to Modern Navigation Systems, World Scientific Publishing Co 2007

Course Title	Introduction to Computer Networks, PG_00047632
ECTS points/workload	3.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	assessment
Description	Student becomes familiar with logical layered architectures, classifies basic networking problems and identifies and analyzes selected protocols and mechanisms implemented in standard LAN and WAN solution
Literature	Nowicki K., Woźniak J.: Przewodowe i bezprzewodowe sieci LAN, OW PW 2002

Course Title	Linear Algebra, PG_00047356
ECTS points/workload	3.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	assessment
Description	Students obtain competence in the range of using methods of linear algebra and knowledge how to solve simple problems that can be found in the field of engineering.
Literature	1. Długosz J., „Funkcje zespolone. Teoria, przykłady, zadania”, Oficyna Wydawnicza GiS 2. Jurlewicz T., Skoczylas Z., „Algebra i geometria analityczna. Definicje, twierdzenia, wzory”, Oficyna Wydawnicza GiS 3. Jurlewicz T., Skoczylas Z., „Algebra i geometria analityczna. Przykłady i zadania”, Oficyna Wydawnicza GiS 4. Jurlewicz T., Skoczylas Z., „Algebra i geometria analityczna. Kolokwia i egzaminy”, Oficyna Wydawnicza GiS

Course Title	Mathematical Analysis II, PG_00047364
ECTS points/workload	5.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	assessment
Description	Students obtain competence in the range of using methods of full range mathematical analysis and knowledge how to solve simple problems that can be found in the field of engineering.
Literature	<ol style="list-style-type: none"> <li>1. Gewert M., Skoczylas Z., "Analiza matematyczna 2. Definicje, twierdzenia, wzory", Oficyna Wydawnicza GiS</li> <li>2. Gewert M., Skoczylas Z., "Analiza matematyczna 2. Przykłady i zadania", Oficyna Wydawnicza GiS</li> <li>3. Gewert M., Skoczylas Z., "Analiza matematyczna 2. Kolokwia i egzaminy", Oficyna Wydawnicza GiS</li> <li>4. Gewert M., Skoczylas Z., "Elementy analizy wektorowej. Teoria, przykłady, zadania", Oficyna Wydawnicza GiS</li> <li>5. Gewert M., Skoczylas Z., "Równania różniczkowe zwyczajne. Teoria, przykłady, zadania", Oficyna Wydawnicza GiS</li> <li>6. Jankowska K., Jankowski T., "Zadania z matematyki wyższej", Wydawnictwo Politechniki Gdańskiej</li> </ol>

Course Title	Mathematical Analysis, PG_00047542
ECTS points/workload	6.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	exam
Description	Students obtain competence in the range of using methods of mathematical analysis and knowledge how to solve simple problems that can be found in the field of engineering.
Literature	<ol style="list-style-type: none"> <li>1. Gewert M., Skoczylas Z., "Analiza matematyczna 1. Definicje, twierdzenia, wzory", Oficyna Wydawnicza GiS</li> <li>2. Gewert M., Skoczylas Z., "Analiza matematyczna 1. Przykłady i zadania", Oficyna Wydawnicza GiS</li> <li>3. Gewert M., Skoczylas Z., "Analiza matematyczna 1. Kolokwia i egzaminy", Oficyna Wydawnicza GiS</li> <li>4. Gewert M., Skoczylas Z., "Analiza matematyczna 2. Definicje, twierdzenia, wzory", Oficyna Wydawnicza GiS</li> <li>5. Gewert M., Skoczylas Z., "Analiza matematyczna 2. Przykłady i zadania", Oficyna Wydawnicza GiS</li> <li>6. Gewert M., Skoczylas Z., "Analiza matematyczna 2. Kolokwia i egzaminy", Oficyna Wydawnicza GiS</li> <li>7. Jankowska K., Jankowski T., "Funkcje wielu zmiennych, całki wielokrotne, geometria analityczna", Wydawnictwo Politechniki Gdańskiej</li> </ol>

Course Title	Mathematical Modelling Methods - project, PG_00047530
ECTS points/workload	1.0
Level	first-cycle studies
Form of Instruction	Project
Form of Examination	assessment
Description	Getting acquainted with main problems of the mathematical modeling methods on the example of projects and practical tasks.
Literature	<ul style="list-style-type: none"> <li>• Z. Kowalczyk, Mathematical Modelling Methods - course notes.</li> <li>• E.A. Bender, An Introduction to Mathematical Modeling, Dover Publications, 2000.</li> <li>• M. Tenenbaum, H. Pollard, Ordinary Differential Equations, Dover Publications, 1985.</li> </ul>

Course Title	Mathematical Modelling Methods, PG_00047561
ECTS points/workload	4.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	exam
Description	The aim of the course is to master the knowledge of methods of mathematical modeling of dynamic processes.
Literature	J. M. Smith: Mathematical modelling and digital simulation for scientists and engineers. Wiley, New York, 1977. H. Orłowski, J. Hawryluk: Modelowanie cyfrowe. WNT, Warszawa, 1971.

Course Title	Metrology - laboratory, PG_00047562
ECTS points/workload	2.0
Level	first-cycle studies
Form of Instruction	Laboratory
Form of Examination	assessment
Description	The aim is to teach: performing measurements of basic electrical quantities: voltage, current, frequency, resistance, capacitance, inductance; operating and making measurements with an analogue and digital oscilloscope; setting up, making measurements, processing of measurement data on computer-controlled measurement systems.
Literature	1. Stabrowski M.: Cyfrowe przyrządy pomiarowe. PWN. 2. Nawrocki W.: Komputerowe systemy pomiarowe, WKiŁ 3. Materiały pomocnicze do wykładu na <a href="http://www.eti.pg.gda.pl/katedry/kmoe/dydaktyka">www.eti.pg.gda.pl/katedry/kmoe/dydaktyka</a>

Course Title	Metrology, PG_00047552
ECTS points/workload	1.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	assessment
Description	The aim is introduction to : the essence of measurement, units and standards, methods of measurement, analysis of measurement uncertainty, basic instruments for measurement of electrical quantities.
Literature	1. Dusza J. : Podstawy miernictwa. OWPW, Warszawa 2002. 2. Lisowski M.: Podstawy metrologii, OWPW, Wrocław 2011. 3. Tumański S.: Technika pomiarowa, WNT, Warszawa 2007. 4. Kamieniecki A.: Współczesny oscyloskop. Budowa i pomiary, Wydawnictwo btc, Legionowo 2009. 5. Stabrowski M. : Cyfrowe przyrządy pomiarowe. Wyd. Naukowe PWN, Warszawa 2002. 6. Zięba A.: Analiza danych w naukach ścisłych i technice, PWN, Warszawa 2013.

Course Title	Microcontrollers and Distributed Microsystems - laboratory, PG_00047586
ECTS points/workload	2.0
Level	first-cycle studies
Form of Instruction	Laboratory
Form of Examination	assessment
Description	Getting to know the PIC18, the AVR and the MCS51 microcontrollers families and the bases related to the configuration and control their peripherals. Acquisition of skills of the IDE software for these families of microcontrollers (creating projects, assembling, compiling, software simulation, programming of microcontrollers). Skill of writing simple programs to handle peripherals of microcontrollers in an assembly language and a C language.
Literature	Czaja Z.:Instrukcje do ćwiczeń laboratoryjnych, <a href="http://www.pg.gda.pl/~zbczaja">http://www.pg.gda.pl/~zbczaja</a> , Gdańsk 2014.



Course Title	Microcontrollers and Distributed Microsystems, PG_00047596
ECTS points/workload	2.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	assessment
Description	<p>Learning the basics of design, operation and control of microcontrollers and their peripheral devices, and also electronic systems: digital buffers, parallel random access memories, SPLDs and CPLDs, selected systems controlled via the SPI interface.</p> <p>Acquisition of the ability to analyze ("read") electronic block schemes and timings describing the behavior of the system at the time (work in "real time"), as well as effective learning skills of the technical documentation.</p>
Literature	<p>Czaja Z.: Mikrosterowniki i mikrosystemy rozproszone – materiały do wykładu, <a href="http://www.pg.gda.pl/~zbczaja">http://www.pg.gda.pl/~zbczaja</a>, Gdańsk 2014.</p> <p>Hadam P.: Projektowanie systemów mikroprocesorowych, Wyd. BTC, Warszawa 2004.</p>

Course Title	Microprocessor Technology, PG_00047698
ECTS points/workload	4.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	exam
Description	<p>Getting familiar with architectures of the selected microprocessors and microcontrollers.</p> <p>Implementation of simple microprocessors-based control circuits.</p> <p>Learning techniques of assembly language programming.</p>
Literature	<p>Misiurewicz P.: Układy mikroprocesorowe. WNT, Warszawa 1983.</p> <p>Niederliński A.: Mikroprocesory, mikrokomputery, mikrosystemy. Wyd. Szkolne i Pedagogiczne, Warszawa 1984.</p> <p>Gałka P., Gałka P.: Podstawy programowania mikrokontrolera 8051. Wyd. Naukowe PWN SA, Warszawa 2006.</p>

Course Title	Modern Computational Tools I, PG_00047629
ECTS points/workload	3.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	assessment
Description	Mastering the skills of programming in languages: MATLAB and Python, and tools associated with them.
Literature	<a href="http://www.mathworks.co.uk/help/index.html">http://www.mathworks.co.uk/help/index.html</a> <a href="http://www.python.org/doc/">http://www.python.org/doc/</a>

Course Title	Modern Computational Tools II, PG_00047693
ECTS points/workload	2.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	assessment
Description	Mastering the skills of programming in languages: MATLAB and Python, and tools associated with them.
Literature	<a href="http://www.mathworks.co.uk/help/index.html">http://www.mathworks.co.uk/help/index.html</a> <a href="http://www.python.org/doc/">http://www.python.org/doc/</a>

Course Title	Modern Programming Environments, PG_00053918
ECTS points/workload	3.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	assessment
Description	Introduce modern parallel-programming environments based on the example of the CUDA technology created by Nvidia.
Literature	<ul style="list-style-type: none"> <li>- CUDA C Programming Guide</li> <li>- CUDA Runtime API</li> <li>- CUDA C Best Practices Guide</li> </ul>

Course Title	Numerical Methods in Automatic Control - laboratory, PG_00047694
ECTS points/workload	2.0
Level	first-cycle studies
Form of Instruction	Laboratory
Form of Examination	assessment
Description	Learning and mastering the practice of modern numerical algorithms required to solve number of engineering problems.
Literature	<ul style="list-style-type: none"> <li>• Lecture notes in Numerical Methods in Automation and Robotics.</li> </ul>

Course Title	Numerical Methods, PG_00047626
ECTS points/workload	2.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	exam
Description	Learning modern numerical algorithms necessary to solve many engineering problems.
Literature	<ul style="list-style-type: none"> <li>• Anthony Ralston, A First Course in Numerical Analysis, 2nd edition, Dover Publications, 2001.</li> <li>• Numerical Recipes in C, Second Edition (1992), <a href="http://http://www.nrbook.com/a/bookcpdf.php">http://http://www.nrbook.com/a/bookcpdf.php</a>.</li> <li>• Steven C. Chapra, Applied Numerical Methods with MATLAB for Engineers and Scientists, 2nd edition, McGraw-Hill, 2006.</li> </ul>

Course Title	Object-oriented Programming and Computer Graphics, PG_00047585
ECTS points/workload	4.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	assessment
Description	The main aim of this subject is to introduce its participants an object oriented programming in Java language (including Java 3D API). Java classess and program development mechanisms are to prepare the students to create applications with computer graphics. The applications include 2D graphics, simple animations as well as 3D graphics (Java 3D API).
Literature	Bruce Eckel, Thinking in Java. Edycja polska (Wydanie IV), Helion 2006  Java 3D API documentation, Oracle ( <a href="http://www.oracle.com">www.oracle.com</a> )

Course Title	Optimization in Automatic Control, PG_00047548
ECTS points/workload	2.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	assessment
Description	To acquaint students with the theoretical foundations of mathematical methods of optimization for problems without and with constraints. In addition, familiarization with computational analytical and numerical methods
Literature	J.Nocedal, S.J.Wright, "Numerical Optimization", Springer, 1999

Course Title	Optimization in Automatics II, PG_00047576
ECTS points/workload	1.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	assessment
Description	Practical knowledge of static optimization algorithms and their application in automation.
Literature	1) Lecture Optimization Principles in Automation. 2) Laboratory instructions.

Course Title	Physical Training, PG_00047565
ECTS points/workload	0.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	assessment
Description	<p>Approving of healthy style of life by means of physical activity.</p> <p>Developing a correct body posture and building up physical fitness.</p> <p>Getting to know basic information about sports disciplines.</p> <p>Using the acquired knowledge in order to choose the proper physical activity.</p>
Literature	<p>1. A joint publication edited by Krzysztof Kaszuba, Piotr Buliński and Kazimierz Rozwadowski, entitled "Vademecum of physical education for the students of Gdańsk University of Technology.", Gdańsk, 2010</p> <p>2. Syllabus worked out by the teachers/coaches</p>

Course Title	Principles of Entrepreneurship and Management, PG_00053921
ECTS points/workload	2.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	assessment
Description	Student will acquire some knowledge on managing hi-tech company in all aspects of activity, with a special focus on marketing.
Literature	student's lecture notes

Course Title	Probability Methods and Statistics, PG_00047544
ECTS points/workload	3.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	exam
Description	<p>Knowledge of basic methods of one- and multidimensional random variable analysis.</p> <p>Knowledge of basic ideas from mathematical statistics.</p>
Literature	Sobczak W., Konorski J., Kozłowska J.: Probabilistyka stosowana, Wyd. PG, 2004r.

Course Title	Production Process Planning, PG_00047704
ECTS points/workload	4.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	exam
Description	Learning methods of production planning, transportation and management in flexible manufacturing systems. The acquisition of skills in operations research algorithms production planning.
Literature	1. T. Sawik, "Optimalizacja dyskretna w elastycznych systemach produkcyjnych". 2. H.A. Taho, "Operations Research". 3.

Course Title	Programmable Digital Circuits, PG_00047705
ECTS points/workload	3.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	assessment
Description	The aim of the course is to provide students with the basic knowledge and skills in the design of digital electronic systems using FPGA technology and VHDL. As a result, students will be prepared to work in companies producing electronic systems using FPGAs and students will be able to participate in specialized EDA software development.
Literature	Zwoliński Mark, "Projektowanie układów cyfrowych z wykorzystaniem języka VHDL", Wydawnictwa Komunikacji i Łączności WKŁ, Warszawa 2007.

Course Title	Programmable Logic Controllers and Process Visualization, PG_00047577
ECTS points/workload	5.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	assessment
Description	Acquainted with programmable logic controllers, their programming and the using in automation. Basic knowledge of supervising, data acquisition and process visualization systems (SCADA).
Literature	1. T.Legierski, J.Kasprzyk, J.Wyrwał, J.Hajda, "Programowanie sterowników PLC", Wyd. Pracowni Komputerowej J.Skalmierskiego  2. A.Maczyński, "Sterowniki programowalne PLC. Budowa systemu i podstawy programowania. Astor

Course Title	Programming Microcomputers, PG_00047696
ECTS points/workload	2.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	assessment
Description	The main aim of the subject is to know basic techniques for assembly programming
Literature	A. Pyrchla, B. Danowski, BIOS. Przewodnik, Helion 2007 E. Wróbel, Asembler Praktyczny kurs asemblera, Helion 2004 J. Hollingworth, D. Buttrfield, B. Swart, J. Allsop, C++ Builder 5 vademecum profesjonalisty tom 1 i 2, Helion 2001 K. R. Irvine, Asembler dla procesorów Intel vademecum profesjonalisty, Helion 2003 S. Kruk, Turbo asembler idee, polecenia, rozkazy procesora Pentium, Mikom 2000 V. Pirogow, Asembler Podręcznik programisty, Helion 2005 Zasoby Internetu

Course Title	Programming Techniques, PG_00047554
ECTS points/workload	2.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	assessment
Description	Learning the art of programming in C + + using dynamic structures, object-oriented programming and graphical environment for use in automation and robotics.
Literature	Bruce Eckel "Thinking in C++", 2nd ed., 2006

Course Title	Semiconductor Devices, PG_00047563
ECTS points/workload	1.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	assessment
Description	Learning through experiments of the operation principles of basic semiconductor devices and learning the methods of measuring their characteristics, as well as learning methods of determining values of their equivalent circuits, useful in designing of electronic circuits.
Literature	Our laboratory instruction booklets. Ch. Papadopoulos, "Solid-State Electronic Devices: An Introduction", Springer 2014 J.-P. Colinge, C.A. Colinge, "Physics of Semiconductor Devices", Springer 2002

Course Title	Sensors and Measurement Converters, PG_00047597
ECTS points/workload	1.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	assessment
Description	Learning of students the basic issues in the metrological..
Literature	J. S. Wilson, Sensor Technology Handbook, Elsevir 2005.



Course Title	Signal Processing - laboratory, PG_00047521
ECTS points/workload	1.0
Level	first-cycle studies
Form of Instruction	Laboratory
Form of Examination	assessment
Description	Student uses MATLAB tools for implementation of discrete-time signal processing algorithms, and their application to the analysis of signals and systems in the time and frequency domains (FFT), and to designing elementary discrete-time systems.
Literature	<p>1. Allan V. Oppenheim, Ronald W. Schaffer "Discrete-Time Signal Processing - Third Edition", Prentice-Hall Signal Processing Series, 2014</p> <p>2. T.P. Zieliński "Cyfrowe przetwarzanie sygnałów. Od teorii do zastosowań", WKŁ Warszawa 2005.</p> <p>3. Instrukcje laboratoryjne zawierające opracowania teoretyczne zagadnień.</p>

Course Title	Signal Processing, PG_00047551
ECTS points/workload	4.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	exam
Description	Student uses basic analog and discrete-time signal processing algorithms and tools. Student analyzes signals and systems in the time and frequency domains. Student designs elementary discrete-time systems.
Literature	A.V. Oppenheim, R.W. Schaffer with J. R. Buck: Discrete-Time Signal Processing. Prentice Hall International, 1999.

Course Title	Social Sciences for Engineers, PG_00047523
ECTS points/workload	3.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	assessment
Description	The aim of the subject is to familiarize students with the issues related to engineering creativity, culture, the history of civilization, intellectual property protection and linguistic correctness
Literature	1. Chaffee J. „Potęga twórczego myślenia”, GWP, 1998. 2. Goczyła K. „Język polski czy obcy”. Cykl wykładów, WETI PG, 2006-2009. 3. Nęcka E. „Psychologia twórczości”, GWP. Gdańsk 2001. 4. Tatarkiewicz W., "Dzieje sześciu pojęć" PWN, 1988 5. Tatarkiewicz W. "Historia filozofii", PWN 1988 6. Sztompka P. "Socjologia", Wydawnictwo Znak 2005 7. Baly S., "Psychologia wychowawcza w zarysie", PWN 1965 8. Bogucka M., "Dzieje kultury polskiej", Ossolineum 1991 9. Anzenbacher A., "Wprowadzenie do etyki," Wydawnictwo WAM, Kraków 2008. 10. Popek S. "Mechanizmy aktywności twórczej człowieka w świetle interakcyjnej teorii psychologicznej", UMCS 2016 11. Rybotycki C. "Etnografia wobec kultury współczesnej" UJ Kraków 1992

Course Title	Team Project I, PG_00053513
ECTS points/workload	4.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	assessment
Description	<p>Group project is a class, which goal is to prepare students for a future work in a team of several people and to learn them to fulfil scheduled obligations in a timely manner.</p> <p>Project teams consisting of 3-5 students realize subjects chosen from submitted proposals. A product and a proper technical documentation are the effects of a year-long work on a chosen problem. The project proposals can be submitted by Department partners and a work progress is controlled by supervisors assigned by a faculty coordinator.</p>
Literature	materials related to the implemented project

Course Title	Team Project II, PG_00053514
ECTS points/workload	2.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	assessment
Description	<p>Group project is a class, which goal is to prepare students for a future work in a team of several people and to learn them to fulfil scheduled obligations in a timely manner.</p> <p>Project teams consisting of 3-5 students realize subjects chosen from submitted proposals. A product and a proper technical documentation are the effects of a year-long work on a chosen problem. The project proposals can be submitted by Department partners and a work progress is controlled by supervisors assigned by a faculty coordinator.</p>
Literature	materials related to the implemented project

Course Title	Vocational Training, PG_00048071
ECTS points/workload	2.0
Level	first-cycle studies
Form of Instruction	Lecture
Form of Examination	assessment
Description	<p>The objectives of practice are as follows:</p> <ul style="list-style-type: none"> <li>• apply knowledge and skills acquired during previous studies,</li> <li>• acquisition of a new knowledge, skills and social competence</li> <li>• knowledge of the industrial environment of teamwork and the conditions and rules in force in this environment</li> <li>• development of appropriate attitudes to work in a team : taking care of the quality of work , timeliness tasks, correct cooperation with others and cells in the place of practice , developing his own initiative in the work environment , the acquisition of skills work efficiently as a team.</li> </ul>
Literature	No recommendations