INSTITUTIONAL INFORMATION

Legal name and address of the institution	Politechnika Opolska/ Opole University of Technology 76 Prószkowska str. 45-758 Opole, Poland
Erasmus+ code of the institution	PL OPOLE02
Official representative of the institution (bilateral agreements)	Aneta Kucińska-Landwójtowicz, PhD Vice-rector for cooperation with social and economic environment
Erasmus+ institutional coordinator	Marta Dębowska, M.A. m.debowska@po.opole.pl Tel: +48 77 449 8516
International Relations Office Head of the Office	Elżbieta Cieślak, M.Sc. e.cieslak@po.edu.pl 16 Mikolajczyka str. 45-271 Opole tel. +48 77 449 85 12
Website	https://dwm.po.opole.pl
Erasmus+ Faculty Coordinators	
Faculty of Civil Engineering and Architecture	Juliusz Kuś, PhD j.kus@po.opole.pl
Faculty of Electrical Engineering, Automatic Control and Informatics	Łukasz Dzierżanowski, PhD l.dzierzanowski@po.opole.pl
Faculty of Mechanical Engineering	Małgorzata Wzorek, Assoc. Prof. m.wzorek@po.edu.pl
Faculty of Physical Education and Physiotherapy	Daria Hołodnik, PhD d.holodnik@po.opole.pl
Faculty of Production Engineering and Logistics	Hanna Ścięgosz, PhD h.sciegosz@po.opole.pl
Faculty of Economics and Management	Roman Śmietański, PhD r.smietanski@po.opole.pl
Deadline for submitting Erasmus online applications	Winter semester: 15th June Summer semester: 15th December

Faculty of Civil Engineering and Architecture	
48 Katowicka str., 45-061 Opole, Poland phone: (+48 77) 4498560 e-mail: wbia@po.opole.pl, http://www.wbia.po.opole.pl	
FIELDS OF STUDY	- Civil Engineering; (BSc, MSc, PhD) - Architecture (BSc)
FACULTY DEPARTMENTS	- Department of Civil Engineering and Urban Planning - Department of Materials Physics - Department of Mechanics and Structural Engineering - Department of Building Materials Engineering - Department of Geotechnics and Geodesy - Department of Roads and Bridges - Department of Civil and Process Engineering
FACULTY ERASMUS COORDINATOR	Juliusz Kuś, PhD; e-mail: j.kus@po.opole.pl

Scientific research conducted at Faculty of Civil Engineering and Architecture includes such unique and vital issues as: mechanics of building structures, seismic and wind engineering, thermal affects on building structures, fire resistance of building structures, thermomechanics, interaction of building structures with subsoil, contemporary issues of building structures physics, building materials engineering in the field of composite materials based on cement and gypsum binding agents, and utilization of industrial waste materials in building materials industry. The academic staff of the Faculty has proved to have significant potential of scientific research, which enables them to conduct research within the fields mentioned above at highest possible standards. This has been confirmed by their achievements recognized both nationwide and worldwide, their active participation in numerous national and foreign scientific conferences as well as their scientific output represented by a plentiful supply of domestic and foreign publications. As far as scientific research is concerned, Faculty of Civil Engineering and Architecture collaborates with a number of technical universities from Austria, the Czech Republic, Germany, Russia, Slovakia, Italy, and Ukraine. The researchers conduct extensive joint research work in partnership with their colleagues from Milan, Vienna, Stuttgart, Dresden, Bochum, Lvov, Prague, Brno, Ostrava, and Bratislava. The outcome of this collaboration is a wide range of joint seminars and scientific publications.

Return to list of faculties

Course code	Course name	ECTS credits
B001	Building Materials	4
B002	Concrete Bridges	6
B003	Concrete Structures	5
B004	Computer science in Engineering	5
B005	Foundation Engineering	4
B006	Principles of Town Planning and Architecture	5
B007	Introduction to Seismic Engineering	6
B008	Soil Mechanics	5
B009	Strength of Materials in Civil Engineering	6
B010	Structural Mechanics I	6
B011	Steel Bridges	5
B012	Environment Protection in Transportation Engineering	4
B013	Road Communication Engineering	6
B014	Transport Engineering I	6
B015	Engineering Surveying	4
B016	Fundamentals of Structural Dynamics	6
B017	Programming of Numerical Methods in MATLAB	6
B018	Hydraulics and hydrology	4
B019	Design Work-Individual Project	4
B020	Geology	6
B021	Steel Structures in Civil Engineering	6
B022	Engineering Structures	6
B023	Structural Mechanics II	6
B024	Individual Project Design	4
B025	Architectural Design II - Single family housing design	7
B026	Computer Methods in Structural Mechanics	5
B027	Theory of Elasticity and Plasticity	6
B028	Transport Engineering II	6
B029	Shell and thinwalled Structures	6
B030	Road traffic safety	4
B031	Architectural Design VII	7
B032	Security, hygienics and first aid in the building enterprise	4
B033	Final Thessis	20
B034	Revitalisation of post industrial areas	8
B036	Underground engineering	4
B037	Urban Communications	4
B038	Construction and Maintenance of Roads and Bridges	4
B039	Buried structures	4
B040	Design of earthen structures in communication buildings	4
B041	Architectural Design IV	6
B042	Training practice	4

Faculty of Electrical Engineering, Automatic Control and Informatics	
76 Prószkowska str., 45-758 Opole, Poland phone: (+48 77) 4498699 e-mail: weia@po.opole.pl, http://www.we.po.opole.pl	
FIELDS OF STUDY	- Biomedical Engineering; (BSc) - Industrial Electronics; (BSc) - Electrical Engineering; (BSc, MSc, PhD) - Automatic Control and Robotics; (BSc, MSc, PhD) - Computer Engineering; (BSc, MSc) - Renewable Engineering Technologies; (BSc, MSc)
FACULTY DEPARTMENTS	- Department of Power, diagnostics and computer engineering - Department of Control Systems and Industrial Automatics - Department of Computer Systems - Department of Intelligent Automatics Systems - Department of Electronics and metrology - Department of Computer Control Systems - Department of Electric Power - Department of High Voltage and Materials Engineering - Department of Renewable Energy Sources - Department of Biomedical Engineering - Department of Parallel Systems and Artificial Intelligence - Department of Electrical Machines - Department of Electrical Drives and Industrial Electronics - Department of Robotics and Informatics Application - Department of Electrical Engineering and Mechatronics
FACULTY ERASMUS COORDINATOR	Łukasz Dzierżanowski, PhD; e-mail: l.dzierzanowski@po.opole.pl

Faculty of Electrical Engineering, Automatic Control and Informatics came into being in 1966, when - due to social initiative - Higher School of Engineering in Opole was established on 1st June. In 2006 the name of the Faculty of Electrical Engineering and Automatic Control was amended to the Faculty of Electrical Engineering, Automatic Control and Computer Science. The Faculty of Electrical Engineering, Automatic Control and Computer Science seeks to provide an optimum environment for research and scholarly efforts of academic staff members and students in the fields of electrical, electronic, control and computer engineering. The Department offers a wide range of undergraduate and postgraduate study opportunities, both full- and part-time, which lead to the degrees of BSc, MSc and PhD. The BSc and MSc require satisfactory completion of examined lecture courses as well as preparation and oral defense of a dissertation. The BSc and MSc can be conferred in the fields of electrical engineering, computer engineering, control and robotics, electronics and telecommunication and technical science education. The PhD is a research degree, can be granted in the field of electrical engineering or control and robotics, on a basis of oral defense of a doctoral dissertation. Lectures are basically given in Polish, but a bilingual, Polish-German BSc/MSc programme has also been conducted and it is still offered in computer engineering.

Return to list of faculties

Course code	Course name	ECTS credits
E001	Agile management of IT projects	4
E002	Algorithm Design	5
E004	CAD I (2D)	4
E005	CAD II (3D)	4
E007	Circuit Theory	8
E009	Computer Measurement Systems	4
E010	Data Base I	4
E011	Data Structures	5
E012	Designing of data bases	5
E013	Discrete mathematics	5
E014	Digital Signal Processors	4
E015	Graphic Design	4
E017	Electrical Engineering and Electronics	4
E018	Electromagnetic Field Theory	5
E019	Electronic Circuits	4
E020	Embedded Systems	2
E024	High Voltage Electric Equipment Diagnostics	4
E025	Image Processing in Computer Forensics	4
E026	Internet Technology	3
E027	Introduction to Algorithm Design	5
E028	Introduction to Computer Forensics	4
E029	Introduction to Cybersecurity	4
E030	Introduction to Networks	4
E034	Microprocessors Technology	4
E035	Perception in Autonomous Systems	4
E037	Photovoltaic systems	4
E041	Power Electronics I	4
E042	Programming Essentials in Python	4
E043	Programming Graphic Aplications	4
E044a	Programming II	5
E044b	Programming III	6
E045	Software Engineering	6
E046	Specialized Programming Languages	4
E047	Statistical Inference and Operational Research	6
E048	Switching, Routing, and Wireless Essentials	4
E049	System programming: Concurrent and Distributed Systems	5
E050	User Experience Design	4
E051	Work safety and ergonomic	4

Faculty of Mechanical Engineering	
5 Mikołajczyka str., 45-271 Opole, Poland phone: (+48 77) 4498482 e-mail: wmech@po.edu.pl, http://wm.po.edu.pl	
FIELDS OF STUDY	- Mechanical Engineering (BSc, MSc, PhD) - Power and Environmental Engineering (BSc) - Environmental Engineering (BSc, MSc, PhD) - Mechatronics (BSc, MSc) - Industrial Design (BSc)
FACULTY DEPARTMENTS	- Department of Process and Environmental Engineering - Department of Mechanics and Machine Design - Department of Vehicles - Department of Thermal Engineering and Industrial Facilities - Department of Manufacturing Engineering and Automation
FACULTY ERASMUS COORDINATOR	Małgorzata Wzorek, Assoc. Prof.; e-mail: m.wzorek@po.edu.pl

The Faculty of Mechanical Engineering is a modern research unit of Opole University of Technology which has a half century of tradition. It is a well-equipped research and education center with nationwide importance, strong links with industry, and very good international collaboration. We are among the most prestigious units in the country.
We invite you to study at the Faculty of Mechanical Engineering!!! This is an invitation to reach out for a very good general education that simplifies constant development by gaining new skills, and reaching out for thorough technical knowledge and specialised education.
The Faculty of Mechanical Engineering offers 3 semester MSc studies: Environmental Engineering in the specialization: Advanced Technologies in Environmental Engineering (ATEE).

Return to list of faculties

Course code	Course name	ECTS credits
M001	Mechanics	5
M002	Machine Design	6
M003	Machine Life	5
M004	Materials science	4
M005	Strength of Materials	6
M006	Mechanics Elements and Machines Design	5
M007	Structural Mechanics in Machine Design	6
M008	Simulation in Machine Dynamics	6
M009	Steel Structures	6
M010	Welding	4
M011	Hydraulic Machines	4
M012	Fluid Mechanics	6
M013	Technology of manufacturing	4
M014	Engineering Vibration Analysis of Mechanical Systems	4
M015	Rapid prototyping	4
M016	Finite element method	4
M017	Computer Aided Design	6
M018	Statistics for Engineers	4
M019	Advanced CAD/CAE design	4
M020	Dynamics of the vehicle	4
M021	Computer aided programming of the CNC machine tools	4
M022	Information Technology (IT) in Engineering	4
M023	Graphical programming in mechatronic systems	5
M024	Combustion engines	5
M025	Informatics	6
M026	Building Structures	6
M027	Information Technology	4
M028	Basic of Automatics	4
M029	Basics of ecology	4
M030	Environmental Chemistry and Analytics	5
M031	Water Technology	6
M032	Wastewater treatment Plants Design	4
M033	Industrial WastewaterTreatment	4
M034	Technical Systems of Sanitary	4
M035	Modeling of Water Dystrybution Systems	6
M036	Hydrology and Hydraulics	4
M037	Meteorology and Climatology	4
M038	Air Pollution Control	6
M039	Pollution Diffusion in Atmosphere	6
M040	Advanced metrology in mechanical and environmental engineering	6
M041	Environmental Engineering	4
M042	Applications of Geographic Information Systems (GIS)	4
M043	Noise measurement and control	4
M044	Heating systems and building energy audit	5
M045	Fuels Combustion in Industry	4

M046	Alternative Energy Sources	5
M047	Applied Thermodynamics	6
M048	Energy and Environmental Analysis and Prefeasibility Studies	5
M049	Modeling of Energy Systems	5
M050	Technologies and industrial apparatus	5
M051	Heat Transfer	6
M052	Heat and Mass Transfer Operations	6
M053	Processes and Technology of Production	4
M054	Process Engineering	6
M055	Selected Elements of Process Engineering	6
M056	Mechanical Operations	4
M057	Bioprocess Engineering	6
M058	Engineering of Reactors	6
M059	Design Work - Installation for Solution Production	6
M060	Design Work - Installation for gas cooling and humidification	6
M061	Process Flow Systems	4
M062	Sustainable Development for Engineers	4
M063	Spatial Planning and Urban Design	4
M064	Basics of Business Entities of Economy	4
M065	Organization of Agricultural Production	4
M066	Biological Wastewater Treatment: Principles, Modelling and Design	4

Faculty of Physical Education and Physiotherapy	
76 Prószkowska str., 45-758 Opole, Poland phone: (+48 77) 4498250 e-mail: wwfif@po.opole.pl, http://www.wwfif.po.opole.pl	
FIELDS OF STUDY	- Physiotherapy (BSc, MSc) - Physical Education (BSc, MSc) - Tourism and Recreation (BSc, MSc)
FACULTY DEPARTMENTS	- Department of Biological Sciences - Department of Biochemistry and Physiology - Department of Basics of Physiotherapy - Department of Clinical Physiotherapy - Department of Humanistic Sciences - Department of Physical Education Methodology - Department of Sports - Department of Biomechanics - Department of Anthropomotorics - Department of Active Forms of Tourism and Recreation - Department of Tourism and Health Promotion - Department of Geography and Tourism Economics
FACULTY ERASMUS COORDINATOR	Daria Hołodnik, PhD; e-mail: d.holodnik@po.opole.pl

Faculty of Physical Education and Physiotherapy at Opole University of Technology derived from the unit of Physical Education and Sport operating in the institution since 1968. The motto of Faculty of Physical Education and Physiotherapy is “Physical activity determines man’s fitness and health”. The faculty integrates academic teachers, physiotherapists and enthusiasts of tourism and recreation from all over the region. Students may follow their academic career on 1st and 2nd cycle studies. In order to improve the quality of teaching, the faculty commenced cooperation with leading medical centers, as well as with scientific companies from Poland and Europe. The scope of the research involves a wide range of issues and studies on patients suffered from various diseases, amateur athletes and professional players of handball, football, hockey, basketball, and also swimmers, athletes, short track, cyclists, etc. With a special focus on: level of training, adaptation capacity to a physical effort , level of a physical efficiency, ability to undertaking defined level of physical effort , prospect on physical development , studies of balance. Researchers represent various areas of science - biomechanics, biochemistry and specialization - teachers of PE, instructors and coaches. The research conducted in the units has been granted with an approval from Committee of Bioethics.

Return to list of faculties

Course code	Course name	ECTS credits
F03	Kinesiotaping	4
F06	Practical Training	6
F07	Functional Diagnostics and Rehabilitation Programming in Rheumathology	4
F08	Therapeutic Massage	4
F10	Adapted sport and recreational physical activity	4
F11	Clinical Reasoning and ICF Model Based Rehabilitation	4
F12	Neurorehabilitation	5
F13	Orthopedic and Sport Rehabilitation	4
F14	Lymphatic drainage	4
F15	Physiotherapy in gynecology and obstetrics	5
F17	Biomechanical assessment of the musculoskeletal system	5
TR01	Marketing	5
TR02	Tour Guiding	4
TR03	Physiotherapy Clinic Management	5
TR04	Hospitality and Food Management	5
TR05	Tourism Product	4
TR06	Agro and Ecotourism	4
TR07	Management	5
TR10	Marketing of Tourism and Leisure	4
TR11	Travel Consultancy	5
TR12	Relaxation and regeneration methods	4
TR18	Wine Tourism	5
TR20	Alpine Skiing	5
WF01	Theory and Methodology of Team Sport - Volleyball	4
WF02	Theory and Methodology of Individual Sports - Swimming	5
WF03	Didactics of Physical Education	4
WF04	Summer Training Camp	5
WF05	Theory and Methodology of Team Sport - Basketball	4
WF06	Human Kinetics/ Anthropomotorics	4
WF07	Theory and Methodology of Individual Sports - Gymnastics	4
WF08	Health Education	4
WF09	Basics of Self-Defence	4

Faculty of Production Engineering and Logistics	
31 Sosnkowskiego str., 45-272 Opole, Poland phone: (+48 77) 4498744 e-mail: wipil@po.opole.pl, http://www.wipil.po.opole.pl	
FIELDS OF STUDY	- Management and Production Engineering (BSc, MSc) - Logistics (BSc, MSc) - Security Engineering (BSc) - Food Technology and Human Nutrition (BSc)
FACULTY DEPARTMENTS	- Department of Mathematics and IT Applications - Department of Physics - Department of Engineering and Work Safety - Department of Logistics - Department of Applications of Chemistry and Mechanics
FACULTY ERASMUS COORDINATOR	Hanna Ścięgosz, PhD; e-mail: h.sciegosz@po.opole.pl

Faculty of Production Engineering and Logistics was created on the basis of the Institute of Mathematics, Physics and Chemistry. The Institute was founded in 1975 as an interfaculty unit whose objective was to conduct research as well as didactic classes of mathematics, physics and chemistry in all fields and courses of studies (first at Higher School of Engineering, afterwards at Opole University of Technology). Currently the faculty has been performing above mentioned tasks, though it has broadened its didactic offer effectively. Faculty research and didactic employees conduct classes of not only basic subjects like mathematics, algebra with geometry, mathematical analysis, physics and chemistry but also of numerical methods, mathematical statistics, calculus of probability, operational research, computer science, selected programming languages, databases, logistics, computer networks and philosophy of nature. Furthermore, didactic offer has been significantly enriched since the creation of the Institute by extending the scope of subjects connected with work environment engineering, logistics and production engineering as well as subjects concerning teaching technology and computer science at schools and selected technical subjects.

Return to list of faculties

Course code	Course name	ECTS credits
T001	Linear algebra with analytic geometry	6
T003	Differential Equations	4
T004	Ecology	4
T006	Entrepreneurship for Engineers	4
T007	Fundamentals of Management (at Faculty of Production Engineering and Logistics)	6
T008	Industrial Marketing	4
T009	Innovation Management	4
T010	Logistics and Supply Chain Management	6
T011	Service Quality Management	4
T012	Marketing	4
T014	Mathematics I	6
T015	Mathematics II	5
T016	Mathematics III	4
T019	Project Management (at Faculty of Production Engineering and Logistics)	4
T020	Quality Management (at Faculty of Production Engineering and Logistics)	5
T021	Quality Management of Production	4
T023	Management of project teams	4
T024	Control Theory	5
T026	Operational Research	6
T027	Statistics	5
T028	Investment Project Management	4
T029	Methods and Techniques of Project Scheduling	5
T030	Numerical Methods	4
T031	Advanced Mathematics	4
T032	Application of the Mathematica Package	4
T033	Microeconomics	4

Faculty of Economics and Management	
7 Luboszycka str., 45-036 Opole, Poland phone: (+48) 77 449 88 00 e-mail: weiz@po.opole.pl, http://www.weiz.po.opole.pl	
FIELDS OF STUDY	- Management (BSc, MSc) - International Economics Relations (BSc) - Administration (BSc) - Economics (BSc, MSc)
FACULTY DEPARTMENTS	- Department of Organization and Business Management - Department of Humanities and Law - Department of Regional Policy - Department of Economics, Finance and Regional Research - Department of International Economic Relations - Department of Intellectual Property, Administrative and European Law - Department of E-Business and Electronic Economy
FACULTY ERASMUS COORDINATOR	Roman Śmietański, PhD; e-mail: r.smietanski@po.opole.pl

The Faculty of Economics and Management currently offers a broad range of studies on both Bachelor and Master degrees. The majority of the academic staff participates in research projects which are mostly conducted under statutory research programmes as well as the Faculty's own programmes. The Faculty's main research activities are concentrated on: sustainable socio-economic and ecological growth in regional development, system transformation influence on demographic situation and education of human capital in the Silesia region, conditions of balanced regional development in Poland following European Union accession (particularly external migration processes and Opole region), mathematic aid in regional development programming, the role of work resources in the formation of Silesia region competitiveness, seasonal migrations from the Silesia region to the European Union countries (diagnosis and forecast), selected problems of European Union law, particularly Common Foreign Policy and European Union security, marketing and logistics integration – premises, determinants, symptoms and effects. In addition to research conducted under statutory research programmes and as the Faculty's own programmes, the Faculty staff takes part in research projects within European Union Programmes mostly in cooperation with governmental organizations and industrial enterprises. The Faculty has a Development Projects Office whose main task is to administer the development projects realized by the Faculty and assistance in acquiring new projects. Faculty staff members are members of various scientific and technical organizations and associations.

Return to list of faculties

Course code	Course name	ECTS credits
AL010	Basic in Jurisprudence	6
AL012	Administrative science	5
AL013	Constitutional Law	6
AL020	Fundamentals of Labour Law and Rights of Officials	4
DAL005	International Law	4
DAL030	System of local government	4
DEKL001	Migration and labour market	5
DEKL021	International Economic Integration	4
DZL002	Stress Management	4
DZL003	Decision Making in the System for Pairwise Judgments	6
DZL004	Change Management	4
DZL007	Conflicts resolution	5
DZL042	Oragnizational Culture	4
DZM004	Ethics in management	4
DZMZP1_4	Diversity management	4
EKL008	Microeconomics	6
EKL011	Mathematics	6
EKL024	Sustainable Regional Development	4
EKL026	Introduction to e-business	6
EKL027	Trade and foreign investments	6
EKL027/DE	Handel und Auslandsinvestitionen	6
EKL040	Techniques of negotiations and mediations	4
EKL042	Methodology of Market Research	5
EKM002	Macroeconomics	6
EKM002/DE	Makroökonomie	6
EKM003	Statistical Inference	7
EKM004	Econometric modelling and forecasting	7
EKM016	Concepts of Management	7
EKM020	Quality Policy	5
EKM032	Social research methods	5
EKM034	Communication in team leading	5
EKM041	Society and culture of Europe	4
ZL008	Fundamentals of Management	8
ZL009	Science of Organization	7
ZL014	Mathematics in Economics and Management	7
ZL015	Descriptive Statistics	6
ZL016	Organizational Behavior	4
ZL017	Project Management	4
ZL018	Human Resources Management	6
ZL019	Quality Management	7
ZL020	Information technology in management	4
ZL021	Basics of Marketing	7
ZL022	Marketing Research	7
ZL024/R	Finansy priedprijatji	7
ZL034	Decision making processes in management.	5

ZL035	Innovation in Business	5
ZL036	Production and Services Management	5
ZL041	Business Plan	5
ZM035	Psychology of management	5
ZM038	Time management and personal development	5
ZM048	Brand management	4
ZM049	Corporate Social Responsibility	5
ZM050	International Marketing	5
ZM054	Sales management	5
ZMZP1_5	Process Management	4
ZMZP1_6	Marketing in Business	4
ZMZP2_2	Strategic Management	6
ZMZP2_4	Commercial Law	5

Course name: **Building Materials**	
Course code: B001	**Form of class:** Lecture, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Jurowski Krystian, k.jurowski@po.opole.pl	
Prerequisites: English (min B1 level), Chemistry, Physics.	
Objectives of the course and learning outcomes: Basic knowledge about building materials in an aspect of civil engineering	
Teaching program: The basic technical properties of building materials. Natural stone materials and their application in the building industry. Mineral pneumatic binding materials: lime, gypsum. Hydraulic binding materials: cement. Building ceramic wares. Architectural glass. Metals applied in the building engineering. Special materials used for thermal and acoustic insulation. Binding agents and bituminous materials. Plastics and plastic products used in building engineering.	
Assessment methods: written/test paper examination, individual/group project paper report and/or presentation	
Recommended reading: Allen, Iano: Fundamentals of Building Construction – Materials and Methods, J. Wiley	

Return to list of courses

Course name: **Concrete Bridges**	
Course code: B002	**Form of class:** Lecture, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Stankiewicz Beata, b.stankiewicz@po.opole.pl	
Prerequisites: English (min B1 level), Basic knowledge about concrete structures, structural mechanics, strenght of materials.	
Objectives of the course and learning outcomes: Basic knowledge about architecture and dimensioning of concrete bridges	
Teaching program: Historical outline. The classification of concrete bridges. Materials used for building of the bridges. Principles of dimensioning of concrete bridges. Typical cross-sections of concrete bridges. Elements of fittings for the bridges. Reinforced concrete slab and slab-rib bridges. Bearings of the bridges. Frame, arch and suspension bridges. Prestressed concrete bridges. Foundations of the bridges. Modernisation and strengthening of the bridges.	
Assessment methods: written/test paper examination, individual/group project paper report and/or presentation.	
Recommended reading: Lecture notes	

Return to list of courses

Course name: **Concrete Structures**	
Course code: B003	**Form of class:** Lecture, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Bysiec Dominika, d.pilarska@po.opole.pl	
Prerequisites: English (min B1 level), Strength of Materials, Structural Mechanics, Soil Mechanics and Foundation Engineering.	
Objectives of the course and learning outcomes: Basic knowledge about dimensioning of reinforced concrete structures	
Teaching program: The principles of design. The properties of concrete and reinforcing steel, Methods and structural design. Dimensioning of the cross-section of a reinforced concrete beam for bending and shear. Limit states (ultimate and serviceability) of reinforced concrete structures.	
Assessment methods: Written/test paper examination, individual/group project paper report and/or presentation.	
Recommended reading: Nawy E.G.: Reinforced Concrete, 5th ed. Prentice Hall, 2003; Macgregor J.G.: Reinforced Concrete: Mechanics and Design, Prentice Hall, 1997; Lecture notes	

Return to list of courses

Course name: **Computer science in Engineering**	
Course available with minimum number of 4 participants.	
Course code: B004	**Form of class:** Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Bobra Piotr, p.bobra@po.edu.pl Bońkowski Piotr, p.bonkowski@po.opole.pl Kuś Juliusz, j.kus@po.opole.pl	
Prerequisites: English (min B1 level), Basic knowledge in structural mechanics and strenght of materials.	
Objectives of the course and learning outcomes: Basic knowledge about application of computer programming in engineering.	
Teaching program: Basic concepts of computer science. Formal languages. Algorithms. Forms of recording algorithms. Block diagrams. The prototype of a high-level programming language with structural characteristics. Data structures. Examples of algorithms. Selected numerical algorithms. The structure and general principles of the operation of computers. Basic software and useware. Coding, data storage and access in computer systems. Examples of a one-access operating system (personal computer) and instruction interpreter. Basic functions of a text editor Computer networks. Elements of the Internet. The fundamentals of programming in a high-level language. Compilation of modules and integration tasks. The accuracy of number representation and the accuracy of numerical calculations. Programming of the selected examples of numerical methods and engineering computations with use of a graphical library.	
Assessment methods: Written/test paper examination, individual/group project paper report and/or presentation.	
Recommended reading: Numerical Recipes in Fortran 77, book on-line: http:///www.library.cornell.edu/nr/cbookfpdf.html; Larry R. Nyhoff, Sanford Leestma: Introduction to Fortran 90 for Engineers and Scientists, Prentice Hall, 1996, ISBN: 0135052157; Lecture notes.	

Return to list of courses

Course name: **Foundation Engineering**	
Course code: B005	**Form of class:** Lecture, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Fedczuk Paweł, p.fedczuk@po.opole.pl	
Prerequisites: English (min B1 level), Physics, Mathematics, Geology, Strength of Materials, Engineering Mechanics, Structural Mechanics.	
Objectives of the course and learning outcomes: Basic knowledge about dimensioning of typical foundations.	
Teaching program: The classification of foundations. Design of foundations. Spot footings (kinds and calculations of the load capacity of homogenous and stratified foundation bed, stability and calculations of settlement, dimensioning). Continuous footings (kinds and calculations of the load capacity of homogenous and stratified foundation bed, stability and calculations of settlement, dimensioning). Grillage foundations. Foundation plates. Foundation boxes. Strengthening of the foundation bed. Drainage of the foundation bed and excavations.	
Assessment methods: Written/test paper examination, individual/group project paper report and/or presentation.	
Recommended reading: Braja M.: Principals of Foundation Engineering, Brooks/Cole, Thomson 2004; Atkinson J.H.: The Mechanics of Soils and Foundations, McGraw Hill, Comp. London, New York 1993; Lecture notes.	

Return to list of courses

Course name: **Principles of Town Planning and Architecture**	
Course code: B006	**Form of class:** Lecture, Seminar,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Adamska Monika, mo.adamska@po.opole.pl Szczegielniak Anna, a.szczegielniak@po.edu.pl	
Prerequisites: English (min B1 level), Principles of arts, descriptive engineering.	
Objectives of the course and learning outcomes: Basic knowledge about architecture and town planning in an aspect of civil engineering	
Teaching program: Concepts and definitions. Contemporary comprehension of architecture objectives taking into account a historical point of view. The origin of contemporary architecture, ancient Greece and Rome. Renaissance style, Baroque style, Eclecticism, Secession. The origin of contemporary architecture with regard to structure, Early Christian period style, Gothic style, Romanticism. The outline of history of architecture seen through the structural context. Fields of contemporary architectural design. Building development sets – public sets, dwellings, industry with regard to the land development plan. Contemporary directions in architecture, the school of the international style, late modernism and postmodernism. Structures of unique buildings, large span roofs, geometry, high rise buildings.	
Assessment methods: Written/test paper examination, individual/group project paper report and/or presentation.	
Recommended reading: Pevsner, Fleming, Honour: The Penguin Dictionary of Architecture, Middlesex, 1980; Thoesen Ch.: Architectural theory from the Renaissance to the present, Koln 2003; Vittorio Magnano Lampugnani, Architecture and City Planning in the Twentieth Century, New York 1984; Lecture notes	

Return to list of courses

Course name: **Introduction to Seismic Engineering**	
Course code: B007	**Form of class:** Lecture, Project,
Level of study: postgraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Bońkowski Piotr, p.bonkowski@po.opole.pl Kuś Juliusz, j.kus@po.opole.pl	
Prerequisites: English (min B1 level), Knowledge in structural mechanics, dynamic of structures.	
Objectives of the course and learning outcomes: Acquiring basic knowledge of seismic effects and their modeling when acting on civil engineering structures.	
Teaching program: Introductory information about earthquakes and other seismic effects (rockbursts, traffic vibrations etc). Repetition of basic information about structural dynamics. Response spectrum method for single degree of freedom structures. Introductory information on seismic codes. Response spectrum method for multi degree of freedom structures. Information on seismic codes with particular attention on Eurocode 8.	
Assessment methods: Written/test paper examination, individual/group project paper report and/or presentation.	
Recommended reading: Clough, Penzien „Dynamics of Structures” A.K.Chopra „Dynamics of Structures”	

Return to list of courses

Course name: **Soil Mechanics**	
Course code: B008	**Form of class:** Lecture, Laboratory, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Fedczuk Paweł, p.fedczuk@po.opole.pl	
Prerequisites: English (min B1 level), Physics, Mathematics, Geology, Strength of Materials, Engineering Mechanics.	
Objectives of the course and learning outcomes: Basic knowledge about soil properties in an aspect of civil engineering	
Teaching program: The three-phase structure of soils. The origin of soils. The classification of soils. The physical properties of soils. Ground water. The mechanical properties of soils. Stresses in the foundation bed. Ground settlement. The load capacity of the foundation bed.	
Assessment methods: Written/test paper examination, individual/group project paper report and/or presentation.	
Recommended reading: Atkinson J.H., Bransby P.L.: The Mechanics of Soils, McGraw Hill, London, 1978; Atkinson J.H.: The Mechanics of Soils and Foundations, McGraw Hill, Comp. London, New York 1993; Lecture notes	

Return to list of courses

Course name: **Strength of Materials in Civil Engineering**	
Course code: B009	**Form of class:** Lecture, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Czabak Mariusz, m.czabak@po.opole.pl	
Prerequisites: English (min B1 level), Engineering Mechanics, Mathematics, Linear Algebra.	
Objectives of the course and learning outcomes: Basic knowledge about methods and concepts of strength of materials used in dimensioning of engineering structures	
Teaching program: Determination of the internal forces in the complex rod systems. Fundamentals of solid body mechanics. Description of stress and strain state in a deformable solid. Physical equations of the linear elasticity. The simple cases of strength of materials: pure compression and tension, pure shear, bending and torsion. Basic calculations of displacements of rod structures.	
Assessment methods: Written/test paper examination, individual/group project paper report and/or presentation.	
Recommended reading: Hibbeler R.C.: Mechanics of Materials, 4th ed., Prentice-Hall, New Jersey, 2000; Lecture notes	

Return to list of courses

Course name: **Structural Mechanics I**	
Course code: B010	**Form of class:** Lecture, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Bobra Piotr, p.bobra@po.edu.pl	
Prerequisites: English (min B1 level), Engineering Mechanics, Mathematics, Linear Algebra.	
Objectives of the course and learning outcomes: Basic knowledge about methods and concepts of structural mechanics used in calculations of internal forces for engineering structures	
Teaching program: Analysis of statically determinate structures: beams, three-hinged arches and frames, trusses, space framework and influence lines for them. Envelopes of internal forces for moveable and variable loads. The kinematic analysis of structures. The virtual work principle under the virtual states of displacement and loads. The analysis of statically indeterminate structures by the method of forces: continuous beams and their influence lines, plane frames, arches, trusses, grids.	
Assessment methods: Written/test paper examination, individual/group project paper report and/or presentation.	
Recommended reading: Meriam J.L. Kraige L.G.: Engineering mechanics-statistics, J. Wiley	

Return to list of courses

Course name: **Steel Bridges**	
Course available with minimum number of 4 participants.	
Course code: B011	**Form of class:** Lecture, Group tutorial,
Level of study: postgraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Jakiel Przemysław, p.jakiel@po.opole.pl	
Prerequisites: English (min B1 level), Steel Structures, Strength of Materials, Structural Mechanics, Basis about Bridge Structures.	
Objectives of the course and learning outcomes: Basic knowledge about rational dimensioning and designing of modern steel bridge structures.	
Teaching program: Basic knowledge about materials and structures concerning steel bridges. The principles of design road and railway steel bridges: steel bridge decks, cross-sections, plate, box and composite girders, portal, truss and arch girders, bracings, layout of steel suspension and cable-stayed bridges, bearings, pretension of steel bridges. Methods and structural design. Limit states design (ultimate and serviceability) of steel bridge structures.	
Assessment methods: Written/test paper examination, individual/group project paper report and/or presentation.	
Recommended reading: a.Chatte Sukhen, The Design of Modern Steel Bridges Book. Wiley Blackwell, 2003. b.Ghosh Utpal K., New Design and Construction of Steel Bridges. Taylor	

Return to list of courses

Course name: **Environment Protection in Transportation Engineering**	
Course code: B012	**Form of class:** Lecture, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Bęben Damian, d.beben@po.opole.pl	
Prerequisites: English (min B1 level), Mathematics, Physics.	
Objectives of the course and learning outcomes: Basic knowledge about environment protection in transportation engineering	
Teaching program: European program of the environmental protection (The Ecological Network Nature 2000). Noise caused by the transportation engineering. Air pollution nearby roads. Crossings for animals as the effective protection method of wild fauna. Ground and water pollutions during service of the transportation routes. Environmental monitoring in the transportation investments.	
Assessment methods: Written/test paper examination, individual/group project paper report and/or presentation.	
Recommended reading: Salvato J.A., Nemerow N.L., Agardy F.J.: Environmental Engineering (5th Edition), John Wiley	

Return to list of courses

Course name: **Road Communication Engineering**	
Course code: B013	**Form of class:** Lecture, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Napieraj Monika, m.napieraj@po.edu.pl	
Prerequisites: English (min B1 level), Mathematics, Physics.	
Objectives of the course and learning outcomes: Basic knowledge about architecture and dimensioning of communication buildings.	
Teaching program: Polish technical guidelines projections of motor roads. The geometrical formation of motor roads (the road in the plan, in the profile, in the cross-section). Road - earthworks - the projection and the technology of the execution. The projection of road surfaces - methods and Polish catalogues. The projection of cross-roads (Polish directions). Basic engineering of the road traffic (measurement and the analysis of the traffic, the modeling, the capacity of roads, streets and crossings). Basic knowledge about bridges (types, kinds, the classification and the characterization of bridge objects). Bridge constructions - the projection and the execution	
Assessment methods: Written/test paper examination, individual/group project paper report and/or presentation.	
Recommended reading: Lecture notes	

Return to list of courses

Course name: **Transport Engineering I**	
Course code: B014	**Form of class:** Lecture, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Stankiewicz Beata, b.stankiewicz@po.opole.pl	
Prerequisites: English (min B1 level), Mathemathics, Physics.	
Objectives of the course and learning outcomes: Basic knowledge about dimensioning of road and bridge structures.	
Teaching program: The basic technical properties of building materials using for road and bridge structures. The classification of roads. Typical bridge structures. Principles of dimensioning of road structures. Basic rules in highway engineering.	
Assessment methods: Written/test paper examination, individual/group project paper report and/or presentation.	
Recommended reading: Lecture notes, presentations.	

Return to list of courses

Course name: **Engineering Surveying**	
Course code: B015	**Form of class:** Lecture,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Anigacz Wojciech, w.anigacz@po.opole.pl	
Prerequisites: English (min B1 level), ---	
Objectives of the course and learning outcomes: Basic knowledge about engineering surveying in civil engineering	
Teaching program: Levelling. Total stations. Surveying instruments. Electronic and Electro-optical distance measurement. GPS. Examination of the plumb-line and edge of a building. Control checks of hydrotechnical structures on the example of a weir. Inventory surveys of cranes and crane tracks.	
Assessment methods: Written/test paper examination, individual/group project paper report and/or presentation.	
Recommended reading: Uren J., Price W.F.: Surveying for engineers. Fourth edition. Palgrave Macmillan. 2006 Bannister A., Raymond S.: Surveying. Frouth edition. Pitman 1977.	

Return to list of courses

Course name: **Fundamentals of Structural Dynamics**	
Course code: B016	**Form of class:** Lecture, Project,
Level of study: postgraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Bońkowski Piotr, p.bonkowski@po.opole.pl Chmielewski Tadeusz, t.chmielewski@po.edu.pl Kokot Seweryn, s.kokot@po.opole.pl	
Prerequisites: English (min B1 level), Structural mechanics, strenght of materials.	
Objectives of the course and learning outcomes: The student who successfully completes the course will be able to demonstrate a good knowledge of the dynamic behaviour of structures and the related methods of modelling and analysis, with particular emphasis on Civil Engineering applications and linearly elastic analysis. The student will be able to carry out the dynamic analysis of structures modelled as discrete mechanical systems by using both analytical and numerical methods. Furthermore, the student will be able to formulate and solve problems involving simple continuous structures, such as wires, rods, and beams. Lastly, the student will demonstrate awareness of the assumptions made in the definition of the mechanical models and the fields of applicability of the learned techniques.	
Teaching program: Introduction to Structural Dynamics: classification of loads, mechanical systems, and types of analysis. Structures modelled as single-degree-of-freedom mechanical systems: equation of motion, free vibrations, response to dynamic loads, analytical and numerical solution methods. Structures modelled as multi-degree-of-freedom mechanical systems: modal analysis, mode superposition method, energy methods, finite element discretisation. Continuous systems: free vibrations and response to dynamic loads of wires, rods, and beams.	
Assessment methods: Written/test paper examination, individual/group project paper report and/or presentation.	
Recommended reading: R.W. Clough	

Return to list of courses

Course name: **Programming of Numerical Methods in MATLAB**	
Course available with minimum number of 4 participants.	
Course code: B017	**Form of class:** Project,
Level of study: postgraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Bońkowski Piotr, p.bonkowski@po.opole.pl Kokot Seweryn, s.kokot@po.opole.pl	
Prerequisites: English (min B1 level), Basic knowledge about structural mechanics and strenght of materials.	
Objectives of the course and learning outcomes: Students are able to: - propose algorithms of simple tasks, - use basic elements of the program (variables, mathematical operations, conditions, loops, etc.), - use an iterative and recursive procedures, - designed algorithms written in the programming language Matlab - create scripts and functions, - work with the basic data formats, - create a search function and basic methods of sorting by known algorithms, - use the features most used libraries, - create own toolboxes of functions, - own programs to describe and explain.	
Teaching program: The course is designed as an introduction to the problems of algorithms and programming. Students are introduced to the basic concepts of programming, development of algorithms and programs. The emphasis is on the design and implementation of programs. The knowledge of the basic elements of the program is required and students should be able to use these elements. Students are familiar with the programming environment Matlab, where students programmed scripts and functions solving simple problems.	
Assessment methods: Written/test paper examination, individual/group project paper report and/or presentation.	
Recommended reading: Wirth N: Alorithms Data Structures=Program, Prentice Hall, 1976 (EN)	

Return to list of courses

Course name: **Hydraulics and hydrology**	
Course code: B018	**Form of class:** Lecture, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Fedczuk Paweł, p.fedczuk@po.opole.pl Jurasz-Drozdowska Karolina, k.jurasz-drozdowska@po.edu.pl	
Prerequisites: English (min B1 level), Mathematics, Physics.	
Objectives of the course and learning outcomes: Basic knowledge about hydraulics and hydrology in an aspect of civil engineering	
Teaching program: Hydrostatic pressure. Hydrostatic pressure on the flat and curved surfaces. Buoyancy. Equilibrium of bodies submerged. The conditions of equilibrium of floating bodies. The movement of liquid. The viscosity of the liquid. Bernoulli's equation for a fluid stream of perfect and real. Bleed and hydraulic drop. Laminar and turbulent motion. Flow under pressure. Resistance movement. Pipelines, siphon and traps. Movement in open troughs. Energy self (internal). Hydraulic jump, its form and length. Damming. Transfers of a sharp edge (thin wall) - non sunk and sunk. Transfers of practical shapes. Spillways (without vacuum). Transfers with a wide crown. Calculating the width of the transfer (light weir). Calculation of the accumulation of money transfer. Light bridges and culverts. Calculation of light bridges. Calculation of the culverts. The movement of groundwater. Ditches and wells. Drainage trenches. Types of drainage. Drainage. Needle-filters. Manholes. Filtration in the construction industry. Filtration of the buildings. Filtration through embankments, dikes and the dam. Hydrometric measurements. Measurement of water status. Measurement of depth. Measurement of flow velocity. Measurement of flow rate. Measurement of sediment transport. Stocks and flows in rivers. Water states. Characteristic states. Flow curve. Flow characteristics. Water balance.	
Assessment methods: Written/test paper examination, individual/group project paper report and/or presentation.	
Recommended reading: Gribbin John E.: Introduction To Hydraulics	

Return to list of courses

Course name: **Design Work-Individual Project**	
Course code: B019	**Form of class:** Lecture, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Kuś Juliusz, j.kus@po.opole.pl	
Prerequisites: English (min B1 level), Mathematics, Physics.	
Objectives of the course and learning outcomes: Knowledge about hydraulics and hydrology in an aspect of civil engineering	
Teaching program: Individual project of dam.	
Assessment methods: Written/test paper examination, individual/group project paper report and/or presentation.	
Recommended reading: Gribbin John E.: Introduction To Hydraulics	

Return to list of courses

Course name: **Geology**	
Course code: B020	**Form of class:** Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Duda Józef, jo.duda@po.opole.pl	
Prerequisites: English (min B1 level), - Student has basic knowledge about physical and chemical processes, - Student can read maps and do technical drawings	
Objectives of the course and learning outcomes: After the course student: - is able to identify basic kinds of rocks and can find optimal application for each kind; - is able to identify basic types of ground, and understands the influence of ground conditions on engineering objects stability; - knows the basic laws for groundwater migration and influence of groundwater conditions on engineering objects.	
Teaching program: - Introduction to mineralogy and petrology; - Recognition and description of ground types; - Geological maps and geological cross-section; - Geotechnical cross-section; - Hydrogeology in civil engineering; - Documentation of geological and geotechnical works.	
Assessment methods: Written/test paper examination, individual/group project paper report and/or presentation.	
Recommended reading: Blyth F.G.M., de Freitas M.H.: A Geology for Engineers. Elsvier 1984	

Return to list of courses

Course name: **Steel Structures in Civil Engineering**	
Course code: B021	**Form of class:** Lecture, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Kuś Juliusz, j.kus@po.opole.pl	
Prerequisites: English (min B1 level), Strength of materials, structural mechanics.	
Objectives of the course and learning outcomes: Understands the importance of right design of metal structures .	
Teaching program: Steel properties. Metallurgic products. Ultimate limit states and serviceability limit states of steel structures. Design of uniform simple steel columns, beams and beams systems.	
Assessment methods: Written/test paper examination, individual/group project paper report and/or presentation.	
Recommended reading: Karuna Moy Ghosh - Practical Design of Steel Structures - Based on Eurocode 3 (with case studies):A multibay melting shop and finishing mill building. AISC - Specification for structural steel buildings. NS Trahair (et. al.) - The behaviour and design of steel structures to ec3 (4th edition)	

Return to list of courses

Course name: **Engineering Structures**	
Course code: B022	**Form of class:** Lecture, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Kuś Juliusz, j.kus@po.opole.pl	
Prerequisites: English (min B1 level), Strength of materials, structural mechanics.	
Objectives of the course and learning outcomes: Knowledge on basic loads acting on structures. Basic knowledge on dimensioning of reinforced concrete structures in industrial plants.	
Teaching program: Rules of organization, design, supervision and standardization in industrial structures. Characteristics of external demands occurring in the design of industrial structures. Characteristics of unification and structural solutions in industrial structures. Characteristics of the load diversity in industrial structures. Characteristics of the structure and design principles of high brick and reinforced concrte chimneys.	
Assessment methods: Written/test paper examination, individual/group project paper report and/or presentation.	
Recommended reading: Arthur Nilson,David Darwin, Charles Dolan - Design of Concrete Structures - McGraw-Hill. Wai-Fah Chen - The Civil Engineering Handbook (New Directions in Civil Engineering. Chris J. Brown - Silos: Fundamentals Of Theory, Behaviour, And Design.	

Return to list of courses

Course name: **Structural Mechanics II**	
Course code: B023	**Form of class:** Lecture, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Bobra Piotr, p.bobra@po.edu.pl Kokot Seweryn, s.kokot@po.opole.pl	
Prerequisites: English (min B1 level), Structural Mechanics I, Mathematics, Linear Algebra.	
Objectives of the course and learning outcomes: Advanced knowledge about methods and concepts of structural mechanics used in calculations of internal forces for engineering structures	
Teaching program: Analysis of statically determinate structures: beams, three-hinged arches and frames, trusses, space framework and influence lines for them. Envelopes of internal forces for moveable and variable loads. The kinematic analysis of structures. The virtual work principle under the virtual states of displacement and loads. The analysis of statically indeterminate structures by the method of forces: continuous beams and their influence lines, plane frames, arches, trusses, grids.	
Assessment methods: Written/test paper examination, individual/group project paper report and/or presentation.	
Recommended reading: Meriam J.L. Kraige L.G.: Engineering mechanics-statistics, J. Wiley	

Return to list of courses

Course name: **Individual Project Design**	
Course code: B024	**Form of class:** Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Kuś Juliusz, j.kus@po.opole.pl	
Prerequisites: English (min B1 level), Knowledge on basic loads acting on structures. Basic knowledge on dimensioning of reinforced concrete structures and steel structures. Basic knowledge on statics of structures and strength of materials.	
Objectives of the course and learning outcomes: Principles of design, normalization and loads in industrial structures. Computational schemes, load bearing capacity, cracking and strains of industrial chimneys and trusses.	
Teaching program: 1) Draft of high brick or reinforced concrete chimney: calculations and construction drawings. 2) Draft of steel truss: calculations and construction drawings.	
Assessment methods: Written/test paper examination, individual/group project paper report and/or presentation.	
Recommended reading: ---	

Return to list of courses

Course name: **Architectural Design II - Single family housing design**	
Course code: B025	**Form of class:** Lecture, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 7	**Start date:** October, February
Number of hours per week: 3	**Number of hours per semester:** 45
Language of instruction: English	
Name of the lecturer and contact information: Szczegielniak Anna, a.szczegielniak@po.edu.pl	
Prerequisites: English (min B1 level), Basic knowledge about computer aided technical drawing.	
Objectives of the course and learning outcomes: The aim of the course is to acquaint the student with the forms zbudowy freestanding single-family housing and compact. Students gain the ability to design various forms of single-family housing.	
Teaching program: The theme of the project is a single family house detached, carried out in the form of sketchy in the first half of the semester. The second half is devoted to designing the buildings serial (or other form of building compact) on the basis of the concept of small urban settlements done in teams of 2-3. The work is done in the classroom and during individual work outside the university. Taking carry out a critical analysis presented by the participants of solutions of individual adjustment mode, but conducted in the presence of students of the group.	
Assessment methods: Written/test paper examination, individual/group project paper report and/or presentation.	
Recommended reading: Pevsner, Fleming, Honour: The Penguin Dictionary of Architecture, Middlesex, 1980; Thoesen Ch.: Architectural theory from the Renaissance to the present, Koln 2003; Vittorio Magnano Lampugnani, Architecture and City Planning in the Twentieth Century, New York 1984; Lecture notes	

Return to list of courses

Course name: **Computer Methods in Structural Mechanics**	
Course available with minimum number of 4 participants.	
Course code: B026	**Form of class:** Lecture, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Bobra Piotr, p.bobra@po.edu.pl Bońkowski Piotr, p.bonkowski@po.opole.pl Kuś Juliusz, j.kus@po.opole.pl	
Prerequisites: English (min B1 level), Structural mechanics, strength of materials	
Objectives of the course and learning outcomes: The aim of the course is to learn methods used in the engineering calculations (Finite Element Method), including their algorithms and limitations and acquisition of actical skills of modeling of engineering problems and solving them with software based on these methods.	
Teaching program: Application of Finite Element Method in the calculation of rectangular plates. Application of Finite Element Method in calculations of 2D framework structures. Calculations of the 2D framework with use of two computer programs (ARSA/RMWIN) and comparing the results.	
Assessment methods: Written/test paper examination, individual/group project paper report and/or presentation.	
Recommended reading: An Introduction to the Finite Element Method (Mcgraw Hill Series in Mechanical Engineering); The Finite Element Method: Linear Static and Dynamic Finite Element Analysis (Dover Civil and Mechanical Engineering)	

Return to list of courses

Course name: **Theory of Elasticity and Plasticity**	
Course code: B027	**Form of class:** Lecture, Group tutorial,
Level of study: postgraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 4	**Number of hours per semester:** 60
Language of instruction: English	
Name of the lecturer and contact information: Czabak Mariusz, m.czabak@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level), Mathematics, Physics, Structural mechanics, Strenght of materials.	
Objectives of the course and learning outcomes: At the end of the semester, students will be able to: Assess and analyze plastic limit states, understand the elastic and elastic-perfectly plastic behavior of two dimensional plane stress systems and behavior under bending, use the boundary problem for solving two-dimensional plane stress scenarios and plates under bending.	
Teaching program: Stress and strain - definition/component/transformation of stress, principal stress, equilibrium equations for stresses, definition of strain. Stress and strain - transformation/compatibility condition of strain, Hooke's law, polar coordinate, Saint-Venant's principle, boundary condition. Two-dimensional problems in elasticity. Elastic-plastic problems. Yield criteria in two- dimensional stress states.	
Assessment methods: Individual/group project paper report and/or presentation	
Recommended reading: D.e.r. Godfrey, Theoretical Elasticity and Plasticity for Engineers. Thames	

Return to list of courses

Course name: **Transport Engineering II**	
Course code: B028	**Form of class:** Lecture, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Stankiewicz Beata, b.stankiewicz@po.opole.pl	
Prerequisites: English (min B1 level), Transport Engineering I, Concrete Structures, Steel Structures.	
Objectives of the course and learning outcomes: Roads, highways, railways, tunnels, European transport system, bridge structures.	
Teaching program: The planning aspects of transport engineering relate to urban planning. The planning, design, construction, and operation of highways, roads and railways. The highways systems in many countries in Europe. The types of highway interchanges and elements of design. The conception of bridge structure – concrete, steel or composite like element of interchange. The fast train and possibilities of development of high speed railways in Europe. Tunnel buildings using in transport connections. Noise protection near highway by noise barriers.	
Assessment methods: Written/test paper examination, individual/group project paper report and/or presentation.	
Recommended reading: Flexibility in Highway Design, U.S. Department of Transportation Federal Highway Administration, 1997 Interchanges, WSDOT Design Manual M 22-01.08, July 2011 Chapter1360 Own lecturer's materials.	

Return to list of courses

Course name: **Shell and thinwalled Structures**	
Course code: B029	**Form of class:** Project, Seminar,
Level of study: postgraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Kuś Juliusz, j.kus@po.opole.pl	
Prerequisites: English (min B1 level), Mathematics: linear algebra, matrix notation, functions of one and more variables, calculus, ordinary and partial differential equations. Others: basic theory of elasticity, dynamics, theory and practical knowledge of the FEM, including nonlinear problems solution.	
Objectives of the course and learning outcomes: Students will be able to classify correctly individual practical problems in the context of theory of thin-walled bodies. They will discern relevant and irrelevant input parameters from the point of view of structural response and possible failure modes such as large displacements, structural instability or load-bearing capacity. They will be able to select an effective solution algorithm for each problem.	
Teaching program: This course deals with these specifics in detail for individual types of thin-walled structures: membranes, plates, membrane and bending theory of shells and thin-walled beams. Basic equations describing the above problems are formulated, the possibility of their analytical solution is discussed and numerical solution by the FEM. Attention is also paid to the stability and vibration of thin-walled structures.	
Assessment methods: Written/test paper examination, individual/group project paper report and/or presentation.	
Recommended reading: J.F.Doyle: Nonlinear Analysis of Thin-Walled Structures, Springer, 2001. S.Timoshenko, J.M.Gere: Theory of Elastic Stability, McGraw-Hill, 1963. Z.Waszczyszyn et al.: Stability of Structures by Finite Element Method, Elsevier, 1994.	

Return to list of courses

Course name: **Road traffic safety**	
Course code: B030	**Form of class:** Lecture, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Napieraj Monika, m.napieraj@po.edu.pl	
Prerequisites: English (min B1 level), English or German (min B1 level), Transport Engineering	
Objectives of the course and learning outcomes: Basic knowledge about planning of safe intersections, pedestrian crossings and other infrastructure	
Teaching program: - safe organization of traffic - safe intersections and roundabouts, light signals - safe location for pedestrian crossings and bus stops - devices supporting traffic organization - traffic-calming methods - temporary traffic organization	
Assessment methods: Individual/group project paper report and/or presentation.	
Recommended reading: 1. “Pedestrian safety: a road safety manual for decision-makers and practitioners”. WHO, 2013, ISBN 978 92 4 150535 2 2. “National Road Safety Programme 2013–2020”. National Road Safety Council 3. Wegman, F. “The future of road safety: a worldwide perspective”. IATSS Res. 40, 66–71. doi: 10.1016/j.iatssr.2016.05.003 4. “TOWARDS ZERO Ambitious Road Safety Targets and the Safe System Approach”, International Transport Forum 5. Lines, C.J., Machata, K. (2000) Changing streets, protecting people: making roads safer for all. In: Proceedings of the Best in Europe Conference, Brussels, European Transport Safety Council, 2000:37 -47 6. Road safety manual. A manual for practitioners and decision makers 7. Traffic Calming Strategies, Global Designing Cities Initiative 8. “Sicherheit zuerst – Möglichkeiten zur Erhöhung der Straßenverkehrssicherheit in Deutschland“ Wissenschaftlicher Beirat beim Bundesminister für Verkehr, Bau und Stadtentwicklung 9. Wegman, F. “Die zukunft der Straβensicherheit: die Weltstudie” 10. “Verkehrssicherheitshandbuch. Ein Handbuch für Praktiker und Entscheidungsträger” 11. „Planungsempfehlungen für eine Umweltentlastende Verkehrsberuhigung Minderung von Lärm- und Schadstoffemissionen an Wohn- und Verkehrsstraβen“, Forschungsbericht 291 54 507, ISSN 0722-186X 12. „Innerorts Verkehrsberuhigung”, Bundesamt für Strassen ASTRA	

Return to list of courses

Course name: **Architectural Design VII**	
Course code: B031	**Form of class:** Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 7	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Kleszcz Justyna , j.kleszcz@po.edu.pl Szczegielniak Anna, a.szczegielniak@po.edu.pl Wilczek Iwona, iwona@db2.pl	
Prerequisites: English (min B1 level), Student has basic knowledge about architectural design, the master plans, knows basic types of public buildings and its architecture. - Student can draw more complicated architectural projects - Student can present the project	
Objectives of the course and learning outcomes: Student can design a project of complex public building like gallery, museum, theater, can draw a complex architectural project.	
Teaching program: - analising the existing buildings of similar types - analising the given plot - making conclusions on the material given and studied - working on a project with asist and corrections of a teacher	
Assessment methods: Written/test paper examination, individual/group project paper report and/or presentation.	
Recommended reading: Pevsner, Fleming, Honour: The Penguin Dictionary of Architecture, Middlesex, 1980; Thoesen Ch.: Architectural theory from the Renaissance to the present, Koln 2003; Vittorio Magnano Lampugnani, Architecture and City Planning in the Twentieth Century, New York 1984; Lecture notes	

Return to list of courses

Course name: **Security, hygienics and first aid in the building enterprise**	
Course code: B032	**Form of class:** Lecture, Seminar,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Drożdżol Krzysztof, k.drozdzol@po.opole.pl	
Prerequisites: English (min B1 level), Structural mechanics, strength of materials	
Objectives of the course and learning outcomes: Basic knowledge about Occupational Safety	
Teaching program: The working conditions at the construction site. Workers social facilities at a construction site. Principles of work organization at a construction site. Scaffolding and traffic safety on scaffolding. The organization of working at heights. Rules for the use of mechanized equipment for construction site. Security installation work. Safety in deep excavation. Procedure in case of building disasters. Principles of safe demolition. Accidents at work in the construction and occupational diseases. Systems for assessing the victim, rescuer and stress. Proceedings in the case of mechanical injuries. Proceedings in the case of injuries caused by environmental threats. Principles of resuscitation in cases of loss of vital signs.	
Assessment methods: Written/test paper examination, individual/group project paper report and/or presentation.	
Recommended reading: a) Reese Ch. D.: Occupational Health and Safety Management: A practical Approach. CRC, Press, 2008. b) BLS. Survey of occupational injuries and illnesses. Washington, D.C.: U.S. Department of Labor, Bureau of Labor Statistics, Safety and Health Statistics Program. 2002. Nonfatal (OSHA recordable) injuries and illnesses. Industry incidence rates and counts c) "HSE - Construction Industry Statistics". Health and Safety Executive. Retrieved 2015-04-17. d) Swanson, Naomi; Tisdale-Pardi, Julie; MacDonald, Leslie; Tiesman, Hope M. (13 May 2013). "Women's Health at Work". National Institute for Occupational Safety and Health. Retrieved 21 January 2015.	

Return to list of courses

Course name: **Final Thessis**	
Course code: B033	**Form of class:** Seminar,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 20	**Start date:** October, February
Number of hours per week: 3	**Number of hours per semester:** 45
Language of instruction: English	
Name of the lecturer and contact information: Bęben Damian, d.beben@po.opole.pl Kuś Juliusz, j.kus@po.opole.pl	
Prerequisites: English (min B1 level), Strenght of materials, structural mechanics, concrete and steel structures.	
Objectives of the course and learning outcomes: Final thesis theme is linked to knowledge of the some chosen elements of Civil Engineering.	
Teaching program: Teaching program - main areas of the final thesis: - design of steel warehouse, - design of concrete silo or chimney, - design of building for seismic loads,	
Assessment methods: Individual elaboration.	
Recommended reading: According to the area of realized final project.	

Return to list of courses

Course name: **Revitalisation of post industrial areas**	
Course code: B034	**Form of class:** Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 8	**Start date:** October, February
Number of hours per week: 3	**Number of hours per semester:** 45
Language of instruction: English	
Name of the lecturer and contact information: Duda Józef, jo.duda@po.opole.pl Gałkowski Marcin, m.galkowski@po.opole.pl Szczegielniak Anna, a.szczegielniak@po.edu.pl	
Prerequisites: English (min B1 level), - Student has basic knowledge about history of architecture - Student has basic knowledge about the sociological and economical changes - Student can design basic architectural projects - Student can present the project	
Objectives of the course and learning outcomes: After the course student: - knows the history of industrialisation and problems of revitalising postindustrial areas - can analise the historical and/or postindustrial building - can design a project of revitalising a postindustrial building - understands the efect industry has on a landscape	
Teaching program: - analising the existing buildings of similar types - analising the given plot - making conclusions on the material given and studied - working on a project with asist and corrections of a teacher	
Assessment methods: Written/test paper examination, individual/group project paper report and/or presentation.	
Recommended reading: Pevsner, Fleming, Honour: The Penguin Dictionary of Architecture, Middlesex, 1980; Thoesen Ch.: Architectural theory from the Renaissance to the present, Koln 2003; Vittorio Magnano Lampugnani, Architecture and City Planning in the Twentieth Century, New York 1984; Lecture notes	

Return to list of courses

Course name: **Underground engineering**	
Course code: B036	**Form of class:** Lecture,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Bęben Damian, d.beben@po.opole.pl	
Prerequisites: English (min B1 level), Mathematics, Physics, Communication Buildings	
Objectives of the course and learning outcomes: Basic knowledge about underground engineering	
Teaching program: Basic laws of soil mechanics. Geotechnical investigation and design. Choice of tunnels vs. bridges. Cost estimates and overruns. Cut-and-cover. Boring machines. Shafts. Sprayed concrete techniques. Pipe jacking. Box jacking. Underwater tunnels. Temporary way. Enlargement. Open building pit The procedures required for the design of new or refurbished road tunnels located within Motorways and Other Trunk Roads and railway tunnel. It gives guidance on the necessary equipment and Operational and Maintenance Systems that need to be considered by the designer to facilitate continued effective and safe operation.	
Assessment methods: Written/test paper examination, individual/group project paper report and/or presentation.	
Recommended reading: a) Kézdi, L. Rétháti Handbook Of Soil Mechanics: Application Of Soil Mechanics In Practice Examples And Case Histories, Elsevier Science b) DESIGN MANUAL FOR ROADS AND BRIDGES: VOLUME 2: SECTION 2: PART 9: BD 78/99: DESIGN OF ROAD TUNNELS. The Department for Transport. 1999. c) NFPA Standard for Safeguarding Construction, Alteration, and Demolition Operations. National Fire Protection Association. d) "Tunnelling". tunnellersmemorial.com. Retrieved 2010-06-20. e) Bickel. Tunnel engineering handbook, 2nd edition. CBS Publishers, 1995 f) Powers, P.J. Construction de-watering and groundwater control. Hoboken, NJ: John Wiley	

Return to list of courses

Course name: **Urban Communications**	
Course code: B037	**Form of class:** Lecture, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Stankiewicz Beata, b.stankiewicz@po.opole.pl	
Prerequisites: English (min B1 level), Mathematics, Physics, Communication Building.	
Objectives of the course and learning outcomes: Basic knowledge about urban communications.	
Teaching program: Urban transport systems in the world. Characteristics of transport resources (bus, tram, trolley bus, metro, suburban train, unconventional measures). Criteria for the selection of the transport agent. Characteristics of road and street infrastructure and of bus, including solutions to improve the movement of public transport vehicles. Evaluation of the effectiveness of the functional and economic transport investment.	
Assessment methods: Written/test paper examination, individual/group project paper report and/or presentation.	
Recommended reading: McKay, John P. Tramways and Trolleys: The Rise of Urban Mass Transport in Europe,1976. Middleton, William D. 1967. The Time of the Trolley (ISBN 0-89024-013-2). Milwaukee (WI), US: Kalmbach Publishing. Trolleybus history – current collector design. Hardy J. Paris Metro Handbook London, 1999.	

Return to list of courses

Course name: **Construction and Maintenance of Roads and Bridges**	
Course code: B038	**Form of class:** Lecture, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Stankiewicz Beata, b.stankiewicz@po.opole.pl	
Prerequisites: English (min B1 level), Mathematics, Physics, Communication Building.	
Objectives of the course and learning outcomes: Basic knowledge about construction and maintenance of roads and bridges.	
Teaching program: Technology of road pavements. Characteristics of the site and its organization. Mechanization of roadworks. Earthworks in realizations road. Types of road substructures. Tie layers and abrasion - types, aspects of execution. The technology of concrete pavements. Selected studies of asphalt mixtures. Roadway safety, ways to reduce road noise. Types of surface damage. Pavement Condition Assessment System (SOSN). Records roads. Road maintenance works. Devices used to technical state of the surface. Methods for upgrading roads. Supports execution of road and railway bridges. Ways to perform foundations. An overview of the assembly spans the road and rail facilities depending on the terrain, hydrological and geological, transport and equipment. Climb the steps of building bridges, various assembly technologies. Acceptance tests required materials and construction. Bridges as part of the infrastructure. Maintenance management systems for bridges. Maintenance of the organization process, the legal basis. Degradation processes objects. Types and causes damage to the structure, states of emergency. Principles of evaluation of technical and usability. Planning and execution of maintenance works. Systems supporting maintenance. Inspection of bridges in the examples. Development of observations and recommendations in the cards maintenance facilities.	
Assessment methods: Written/test paper examination, individual/group project paper report and/or presentation.	
Recommended reading: a) O'Flaherty, Coleman A. Highways: The Location, Design, Construction	

Return to list of courses

Course name: **Buried structures**	
Course code: B039	**Form of class:** Project, Seminar,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Bęben Damian, d.beben@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level)	
Objectives of the course and learning outcomes: The main aim of the course is to acquaint students with modern buried and underground structures, methods of design, safety requirements.	
Teaching program: - Characteristics of buried and underground structures (history, definitions, corrosion resistance). - Materials used for the construction of buried and underground structures. - Buried and underground structure loads (load principles, arching effect in the ground, load distribution in the ground). - Methods for the construction of buried and underground structures (installation, perform backfill). - Methods for design of buried and underground structures (general principles for design, review of design methods). - Numerical modeling of buried and underground structures (distribution of forces in the ground, classical models of soil, contact layer). - Economics and architecture of buried and underground structures.	
Assessment methods: Presentation/project	
Recommended reading: [1] Chapman D., Metje N., Stark A.: Introduction to tunnel construction. CRC Press, 2010. [2] Beben D.: Soil-Steel Bridges. Design, Maintenance and Durability. Springer, Cham, 2020. [3] Maidl B., Thewes M., Maidl U., Sturge D.: Handbook of Tunnel Engineering I: Structures and Methods. Wiley Ersnt	

Return to list of courses

Course name: **Design of earthen structures in communication buildings**	
Course code: B040	**Form of class:** Lecture, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Fedczuk Paweł, p.fedczuk@po.opole.pl	
Prerequisites: English (min B1 level), Mathematics, Physics, Communication Building	
Objectives of the course and learning outcomes: Basic knowledge about designing of earthen structures in communication builidngs.	
Teaching program: Embankment in transportation, a raised bank to carry a road, railway, or canal across a low-lying or wet area. Embankments are often constructed using material obtained from a cutting. Embankments need to be constructed using non-aerated and waterproofed, compacted (or entirely non-porous) material to provide adequate support to the formation and a long-term level surface with stability. Types of excavation. Equipment. Mass haul planning. Retaining walls. Gabions.	
Assessment methods: Written/test paper examination, individual/group project paper report and/or presentation.	
Recommended reading: a) Scott, J., Loveridge, F.,	

Return to list of courses

Course name: **Architectural Design IV**	
Course code: B041	**Form of class:** Lecture, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Szczegielniak Anna, a.szczegielniak@po.edu.pl	
Prerequisites: English (min B1 level), A student understands the mutual relations between the object and surroundings. A student can make architectural designs of a small and medium complexity level. A student has the knowledge of principles of building drawings preparation.	
Objectives of the course and learning outcomes: A student knows the principles of architectural composition of residential housing complexes. A student knows the principles of architectural designing of residential housing A student understands mutual relations of designed objects of residential housing A student can design and model residential objects.	
Teaching program: Traditional interactive lectures with multimedia techniques. A design prepared manually, part of the theme (milestones) should be elaborated in a form of enclosures.	
Assessment methods: Assessment from the conceptual architectural-building design and the development plan design.	
Recommended reading: Mozas J., Per A. F., Density. New collective Housing., a t architecture publishers Collective Housing, Gingko Press Multifamily Housing, Creating a Community, The Images Publishing Group.	

Return to list of courses

Course name: **Training practice**	
Course code: B042	**Form of class:** Lecture, Seminar,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October
Number of hours per week:	**Number of hours per semester:**
Language of instruction: English	
Name of the lecturer and contact information: Bęben Damian, d.beben@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level)	
Objectives of the course and learning outcomes: The main aim of the course is to acquaint students with selected issues of civil engineering, especially bridges, buried structures, transportation geotechnics	
Teaching program: - Recognition of selected construction processes and the principles of designing selected engineering structures. - Technical trip to example engineering structures. - Preparation of a paper and presentation on the selected topic.	
Assessment methods: Presentation and discussion	
Recommended reading: [1] Weiwei L., Yoda T.: Bridge Engineering. Classifications, Design Loading, and Analysis Methods. Elsevier, 2017. [2] Chapman D., Metje N., Stark A.: Introduction to tunnel construction. CRC Press, 2010. [3] Beben D.: Soil-Steel Bridges. Design, Maintenance and Durability. Springer, Cham, 2020. [4] Maidl B., Thewes M., Maidl U., Sturge D.: Handbook of Tunnel Engineering I: Structures and Methods. Wiley Ersnt	

Return to list of courses

Course name: **Agile management of IT projects**	
Course code: E001	**Form of class:** Lecture, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 4	**Number of hours per semester:** 60
Language of instruction: English	
Name of the lecturer and contact information: Zatwarnicka Anna, a.zatwarnicka@po.opole.pl	
Prerequisites: English (min B1 level), Basic knowledge of Software Engineering. Basic programming skills in a selected programming language - preferably programming web applications or applications for smartphones.	
Objectives of the course and learning outcomes: Preparing students for work in modernly managed project teams. Familiarizing students with agile methodologies of AGILE software development.	
Teaching program: Introduction to issues that will be discussed in class, discussion of literature and methods passing the subject. Discussion of prerequisites. Defining the project life cycle. Differences between the life cycle of the project and the life cycle software. Agile methodologies: SCRUM. Breeding and care of agile project teams. Project planning in SCRUM and fair tracking of project progress. Sprint planning. Planning in the long run. Review and retrospective at the end of the sprint.	
Assessment methods: written/test paper examination	
Recommended reading: 1. http://agilemanifesto.org/ the best information about Agile. 2. https://www.scrum.org/ SCRUM methodologies 3. https://www.scrumguides.org/ Information about SCRUM approach 4. Information and presentation from lecturer.	

Return to list of courses

Course name: **Algorithm Design**	
Course code: E002	**Form of class:** Lecture, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Paszkiel Szczepan, s.paszkiel@po.opole.pl	
Prerequisites: English (min B1 level), Basic knowledge about algorithms	
Objectives of the course and learning outcomes: The graduate has a knowledge about the algorithm design. The graduate can present the algorithm in many ways.	
Teaching program: 1. Cryptography, RSA algorithm - key generation. 2. Metaheuristics: Introduction and classification. Metaheuristics based on social adaptation. 3. Basic Local Search Algorithms. Simulated cooling. 4. Concept and elements of population-based algorithms. 5. Genetic algorithms. Genetic programming. 6. Differential evolution and other algorithms of continuous optimization. 7. Hybrid metaheuristics: populations and trajectories. 8. Memetic algorithms and scattered search.	
Assessment methods: Presentation, coursework, oral test.	
Recommended reading: Cormen T.H., Leiserson C.E., Rivest R.L., Introduction to Algorithms Aho, A. V., Hopcroft, J. E., Ullman, J. D., The Design and Analysis of Computer Algorithms Sedgewick R., Algorithms in C	

Return to list of courses

Course name: **CAD I (2D)**	
Course code: E004	**Form of class:** Lecture, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Dzierżanowski Łukasz, l.dzierzanowski@po.opole.pl	
Prerequisites: English (min B1 level), ---	
Objectives of the course and learning outcomes: The graduate can draw a 2D drawing in AutoCAD	
Teaching program: Introduction to 2D drawing in AutoCAD 1. The interface 2. Drawing tools 3. Editing tools 4. Layers 5. Dimensions 6. Blocks 7. Layouts and printing	
Assessment methods: Coursework	
Recommended reading: AutoCAD 2017 Help Finkelstein Ellen, AutoCAD 2015 and AutoCAD LT 2015 Bible 1st Edition, Wiley, 2015 Omura G., Mastering AutoCAD 2016 and AutoCAD LT 2016, Autodesk Official Press, 2016	

Return to list of courses

Course name: **CAD II (3D)**	
Course code: E005	**Form of class:** Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Dzierżanowski Łukasz, l.dzierzanowski@po.opole.pl	
Prerequisites: English (min B1 level), CAD I	
Objectives of the course and learning outcomes: The graduate can draw a 3D model in AutoCAD	
Teaching program: Introduction to 3D modelling in AutoCAD 1. The interface 2. 3D Drawing tools 3. 3D Editing tools 4. Dynamic blocks 5. Rendering	
Assessment methods: Project	
Recommended reading: Finkelstein Ellen, AutoCAD 2015 and AutoCAD LT 2015 Bible 1st Edition, Wiley, 2015 Omura G., Mastering AutoCAD 2016 and AutoCAD LT 2016, Autodesk Official Press, 2016	

Return to list of courses

Course name: **Circuit Theory**	
Course code: E007	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 8	**Start date:** October, February
Number of hours per week: 3	**Number of hours per semester:** 45
Language of instruction: English	
Name of the lecturer and contact information: Waindok Andrzej, a.waindok@po.opole.pl	
Prerequisites: English (min B1 level), completed mathematical and physical course, good ability in mathematical problems	
Objectives of the course and learning outcomes: The student could solve the basic problems in the area of electric circuit theory for DC and AC currents. He gets the ability to design simply electrical circuits.	
Teaching program: 1. Introduction The physics of electrical current. Forces and work in electrical circuits. Passive components. 2. Voltage and current sources Step, impulse, ramp, sinusoidal and DC currents. Ideal and practical sources. Controlled sources. 3. Linear circuit analysis Voltage and current laws. Node and mesh analysis. Power and energy. Using complex numbers in AC circuit analysis. 4. Three phase circuits 5. Non-sinusoidal period signals. Fourier analysis in the case of impulse, pulse and triangle shape currents. 6. Nonlinear circuits Diodes, transistors and rectifiers.	
Assessment methods: The assessment of the student work will occur on the basis of written essay and written paper examination. The essays has to be ready at the end of the semester. The written test will be held at the end of semester. The exam durations will be about 1,5 hour.	
Recommended reading: [1] Dorf R.C.: The electrical engineering handbook, CRC Press LLC, USA, Boca Raton, 2000. [2] Laughton M.A., Warne D.F.: Electrical Engineer's Reference Book (16th Edition), Elsevier, 2003. [3] Kaplan D.M., White C.G.: Hands-On electronics – a practical introduction to analog and digital circuits, Cambridge University Press, UK, 2003 [4] Bakshi U.A., Bakshi A.V.: Circuit theory, Technical publication Pune, 2009.	

Return to list of courses

Course name: **Computer Measurement Systems**	
Course code: E009	**Form of class:** Lecture, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Rząsa Mariusz, m.rzasa@po.opole.pl	
Prerequisites: English (min B1 level), Elementary knowledge on electrical engineering and electronics	
Objectives of the course and learning outcomes: Presentation of the basic notions and elements of the computer measuring systems. Typical DAQ and SCDA systems. Typical programming environments of computer measuring systems.	
Teaching program: Measurements of basic electric quantities and determination of measurement uncertainty. Students learn principles of operation and service of basic devices for electric measurements. Determination of frequency characteristics of typical circuits for alternating currents including RC LC and RL, determination of resonance frequency of LC. Start of simple control systems including relays. Students learn how to read simple electric schemes and how to connect electric circuits. Investigations on rectifier systems – connection of typical rectifier systems and tests of their action and measurements in characteristic points of electronic circuits.	
Assessment methods: Active work of the students on the topics of the classes. Points for the students activity during the classes. Laboratory classes for small groups of people allow to obtain better results of teaching.	
Recommended reading: 1. Vibration measurement / Gheorghe Buzdugan, Elena Mihailescu, Mircea Rades. - Dordrecht [i in.] : Martinus Nijhoff Publ., 1986.	

Return to list of courses

Course name: **Data Base I**	
Course code: E010	**Form of class:** Lecture, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Paszkiel Szczepan, s.paszkiel@po.opole.pl	
Prerequisites: English (min B1 level), Basic knowledge about data base. Basic knowledge of SQL.	
Objectives of the course and learning outcomes: The graduate has a knowledge about the differences relation databases and objective data bases. The graduate knows Structured Query Language.	
Teaching program: 1. Data model 2. Design of relational databases 3. SQL – Structured Query Language 4. DDL – Data Definition Language 5. PL/SQL language 6. Entity Relationship Modeling 7. Transaction processing 8. Authorize access to the database 9. Database security	
Assessment methods: Presentation, coursework	
Recommended reading: Tom Pender: Database Systems: The Complete Book, 2008. Alan Beaulieu, Learning SQL, O`reilly, 2009 Anthony Molinaro, SQL Cookbook, O`reilly, 2005	

Return to list of courses

Course name: **Data Structures**	
Course code: E011	**Form of class:** Lecture, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Paszkiel Szczepan, s.paszkiel@po.opole.pl	
Prerequisites: English (min B1 level), Basic knowledge about data structures.	
Objectives of the course and learning outcomes: The graduate has knowledge about personal computer’s architecture and about the most popular operating systems. The graduate can determinate the necessary hardware needed for the company according to size and the profile of that firm.	
Teaching program: 1. Introduction to data structures. 2. Stacks and queues. 3. Graph data structures. Graph algorithms. 4. Optimization algorithms graphs: Dijkstra, Floyd-Warshall, Bellman-Ford. Euler and Hamilton cycles. 5. Methods for the exploration of graphs: Breadth-first search and Depth-first search - pseudo code, flowchart, code in C /C#. 6. Trees. Binary trees. Methods of browsing trees: preorder, inorder, postorder. Representation of algebraic expressions.	
Assessment methods: Presentation, coursework.	
Recommended reading: Wirth N., Algorithms Data Structures = Programs Aho, A. V., Hopcroft, J. E., Ullman, J. D., The Design and Analysis of Computer Algorithms Knuth D E. The art of computer programming. Volume 1, Volume 2, Volume 3	

Return to list of courses

Course name: **Designing of data bases**	
Course code: E012	**Form of class:** Lecture, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Paszkiel Szczepan, s.paszkiel@po.opole.pl	
Prerequisites: English (min B1 level), Basic knowledge about data base. Basic knowledge of indexes and transactions.	
Objectives of the course and learning outcomes: The graduate knows antipatterns in DB. The graduate has a knowledge about the differences relation databases and objective data bases.	
Teaching program: 1. The design process – a conceptual overview. Indexes, transactions, and optimizing SQL statements. 2. Logical Database Design Antipatterns: Jaywalking, Naive Trees, ID Required,Keyless Entry 3. Physical Database Design Antipatterns: Rounding Errors, 31 Flavors, Phantom Files, Index Shotgun 4. Query Antipatterns: Fear of the Unknown, Ambiguous Groups, Random Selection, Poor Man’s Search Engine, Spaghetti Query 5. Application Development Antipatterns: Readable Passwords, SQL Injection, Pseudokey Neat-Freak, See No Evil	
Assessment methods: Presentation, coursework.	
Recommended reading: Tom Pender: Database Systems: The Complete Book, 2008. Alan Beaulieu, Learning SQL, O`reilly, 2009 Anthony Molinaro, SQL Cookbook, O`reilly, 2005	

Return to list of courses

Course name: **Discrete mathematics**	
Course code: E013	**Form of class:** Lecture,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Paszkiel Szczepan, s.paszkiel@po.opole.pl	
Prerequisites: English (min B1 level), Basic English. Basic knowledge of mathematics.	
Objectives of the course and learning outcomes: The student has a knowledge about the Discrete mathematics. The student has a knowledge about the Boolean algebra, functions, sets and orders.	
Teaching program: 1. Introduction to discrete mathematics. 2. Binary numeral system - Binary arithmetic. 3. Fundamentals of logic. 4. Sets and orders. 5. Boolean algebras. 6. Boolean functions. 7. Introduction to number theory: modular arithmetic. 8. Computational complexity. 9. Algorithms and data structures. 10. Bases of the theory of the graphics.	
Assessment methods: Presentation, coursework	
Recommended reading: Wirth N., Algorithms Data Structures = Programs. Wyd. Prentice-Hall Of India Pvt. Ltd. Gleick, James, The Information: A History, a Theory, a Flood. New York: Pantheon Books, 2011. Aho, A. V., Hopcroft, J. E., Ullman, J. D., The Design and Analysis of Computer Algorithms Knuth D E. The art of computer programming. Volume 1, Volume 2, Volume 3	

Return to list of courses

Course name: **Digital Signal Processors**	
Course code: E014	**Form of class:** Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Górecki Krzysztof, k.gorecki@po.opole.pl	
Prerequisites: English (min B1 level), Basics of C language, basics of mathematics, basics of microprocessor technology.	
Objectives of the course and learning outcomes: As a result of the course student should know: main features of different families of DSPs processors, characterizing an comparing peripherals of DSP architecture, using peripheral of TMS320C6713 in signal analysis, using Environment of programming Texas Instruments DSP's, projecting and programming simple systems for signal processing (filters, generators)	
Teaching program: Programing environment: Code Composer Studio. Architecture of Digital Signal Processor (DSP) - central processor units, instructions (MAC operations), assembler, cooperating CPU with memories Peripherals of DSP: timers, interruptions – using timers in leds control and using switches. Measuring of periodic signal parameters (fundamental frequency, amplitude, RMS value, period, average value, integral of signal, etc.) Using external codecs - A/D and D/A converters. Projecting and implementation FIR and IIR filters on DSP (TMS320C6713). Implementation of FFT algorithms on DSP (TMS320C6713).	
Assessment methods: Individual programing in laboratory - 3 programs in C language (20 % each) and one project – FIR, IIR or FFT (40%).	
Recommended reading: 1. www.ti.com: spru301c.pdf - TMS320C6000 Code Composer Studio Tutorial, 2. www.ti.com: C6713 data sheet: TMS320C6713.pdf, 3. Lyons R. G.: Understanding Digital Signal Processing, Prentice Hall, New Jersey 2004. 4. DSP implementation using TMS320C6711, TMS320C6713 and TMS320C6416. Texas Instruments teaching ROM.	

Return to list of courses

Course name: **Graphic Design**	
Course code: E015	**Form of class:** Lecture, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Dzierżanowski Łukasz, l.dzierzanowski@po.opole.pl	
Prerequisites: English (min B1 level), Basic knowledge of computer graphics	
Objectives of the course and learning outcomes: The graduate gets familiar with graphic design with knowledge of composition, new trends, typography and color use principles.	
Teaching program: 1. Composition 2. Psychology in design 3. Typography 4. Cameras and lenses 5. Image formats 6. New trends in graphic design	
Assessment methods: Presentation	
Recommended reading: Autodesk 3Ds Max Help, Freeman, M., The Photographer's Eye: Composition and Design for Better Digital Photos, Focal Press Derakhshani, D., Derakhshani R., Autodesk 3ds Max 2016 Essentials, Sybex	

Return to list of courses

Course name: **Electrical Engineering and Electronics**	
Course code: E017	**Form of class:** Lecture, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Rząsa Mariusz, m.rzasa@po.opole.pl	
Prerequisites: English (min B1 level), ---	
Objectives of the course and learning outcomes: Presentation of basic notions, elements and systems applied in electrical engineering and electronics, skill in recognition of typical connection systems, making simple electric systems.	
Teaching program: Measurements of basic electric quantities and determination of measurement uncertainty. Students learn principles of operation and service of basic devices for electric measurements. Determination of frequency characteristics of typical circuits for alternating currents including RC LC and RL, determination of resonance frequency of LC. Start of simple control systems including relays. Students learn how to read simple electric schemes and how to connect electric circuits. Investigations on rectifier systems – connection of typical rectifier systems and tests of their action and measurements in characteristic points of electronic circuits.	
Assessment methods: Active work of the students on the topics of the classes. Points for the students activity during the classes. Laboratory classes for small groups of people allow to obtain better results of teaching.	
Recommended reading: 1.Basic Electrical Engineering : Laboratory and Tutorial Procedures / Zenon Jan Pudlowski. - Sydney : EEERG : University of Sydney, 1991.	

Return to list of courses

Course name: **Electromagnetic Field Theory**	
Course code: E018	**Form of class:** Lecture, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Waindok Andrzej, a.waindok@po.opole.pl	
Prerequisites: English (min B1 level), completed mathematical and physical course, good ability in mathematical problems.	
Objectives of the course and learning outcomes: The student could solve the basic problems in the area of magnetostatic and electrostatic fields, electromagnetic waves and magnetic circuits. He gets the ability to design simply magnetic devices.	
Teaching program: 1. Vector Analysis. Scalar and vector fields. Gradient of a scalar field. Divergence and curl of a vector field. Physical interpretations. Laplacian. Nabla operator. Divergence theorem (Gauss). Stokes theorem. 2. Electrostatic fields in vacuum. Electric Charge and Coulomb's Law. Electric field and electric potential. Laplace and Poisson equations. Capacitors. Potential energy of a group of loads. Electrostatic energy load distribution. Dipoles. 3. Electrostatics in dielectric media. Electric field due to a polarized material. Gauss's Law in a dielectric. Electrostatic boundary conditions in the homogenous and non-homogenous media. Electrostatic energy density in dielectric media. Forces and moments in an electrostatic system. 4. Magnetostatic fields in vacuum. Biote-Savarte-Laplace Law. Solenoidal character of the magnetic induction field. Vector potential. Ampere's Law. Laplace and Poisson equations in magnetostatic field. 5. Magnetism in different materials. Parameters of dia-, para- and ferromagnetic materials. Magnetic field due to a magnetized material. Hysteresis loops in ferromagnetic materials. Magnetic Circuits. Magnetic energy density in linear and nonlinear media. Forces and moments on rigid circuits.	
Assessment methods: The assessment of the student work will occur on the basis of written essay, oral examination and done project. The essays and projects have to be ready at the end of the semester. The oral examination will be held at the end of semester. The exam durations will be about 1,5 hour.	
Recommended reading: [1] Chen H. C.: Theory of Electromagnetic Waves, McGraw-Hill, New York, 1983. [2] Paul C.R., Nasar S.A.: Introduction to electromagnetic fields, McGraw-Hill, New York, 1982. [3] van Bladel J.G.: Electromagnetic Fields, 2nd Edition, Wiley-IEEE Press, New York, 2007. [4] Rothwell E.J., Cloud M.J.: Electromagnetics, 2nd Edition, Boca Raton, CRC Press, 2009. [5] Moliton-Limoges A.: Basic electromagnetism and materials, Springer, 2007.	

Return to list of courses

Course name: **Electronic Circuits**	
Course code: E019	**Form of class:** Lecture, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Dołęgowski Michał, m.dolegowski@po.edu.pl	
Prerequisites: English (min B1 level), Basics of Electronics	
Objectives of the course and learning outcomes: Theoretical and practical knowledge about electronic components and circuits	
Teaching program: - test equipment, - voltage, current and power, - Ohm's law and Kirchhoff's circuit laws, - passive components (resistors, capacitors, inductors and diodes), - active components (bipolar and field effect transistors), - linear and switching power supplies, - power amplifier types (class A, B, AB, D, G and H), - operational amplifier circuits (inverting, non-inverting, follower, comparator, integrator), - combinational logic circuits (logic gates, multiplexers, demultiplexers and decoders), - sequential logic circuits (flip-flops, latches, counters and shift registers), - analog-to-digital and digital-to-analog converters.	
Assessment methods: - practical classes assessment, - individual presentation.	
Recommended reading: [1] Analog Devices: Basic linear design. ebook, 2007 [2] Texas Instruments: Analog engineer's pocket reference. ebook, 2015 [3] Texas Instruments: Analog engineer's circuit cookbook: amplifiers. ebook, 2022 [4] Texas Instruments: Analog engineer's circuit cookbook: data converters. ebook, 2020 [5] Texas Instruments: Digital logic: pocket data book. ebook, 2007	

Return to list of courses

Course name: **Embedded Systems**	
Course code: E020	**Form of class:** Lecture, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 2	**Start date:** October
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Podpora Michał, m.podpora@po.opole.pl	
Prerequisites: English (min B1 level), Basics of computer architecture, operating systems, programming.	
Objectives of the course and learning outcomes: The student is able to: - design a basic Embedded System - wire the hardware prototype - implement software of the Embedded System to get the desired functionality - estimate cost and time needed for designing and implementing a prototype of a specific Embedded System - refine his/her knowledge using Internet resources and whitepapers	
Teaching program: - Arduino basics - Arduino digital I/O - Arduino analog inputs and PWM outputs - Arduino and OneWire, serial, I2C, SPI, etc. - Arduino shields - Raspberry Pi digital I/O - Raspberry Pi interfacing with other systems - Mobile UGV robot - Intelligent home system The student will have the possibility to get the hands-on practical knowledge on Embedded Systems, their principles, design, and implementation.	
Assessment methods: Lecture - written/test paper examination, Laboratory - laboratory report	
Recommended reading: [1] White E., „Making Embedded Systems”, O’Reilly, ISBN 978-1449302146 , 2011 [2] Williams G.H., „Making Things Smart: Easy Embedded ARM Programming For Transforming Everyday Objects Into Intelligent Machines“, ISBN 978-1680451894, 2016 [3] Lee E.A., Seshia S.A., „Introduction to Embedded Systems”, available on-line (2016-12): leeseshia.org	

Return to list of courses

Course name: **High Voltage Electric Equipment Diagnostics**	
Course code: E024	**Form of class:** Seminar,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Kunicki Michał, m.kunicki@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level); Basic Phenomena in High Voltage Engineering; Fundamentals of Electrical Power Engineering	
Objectives of the course and learning outcomes: After the course, the students should be able to know and understand diagnostic methods of high voltage electrical equipment.	
Teaching program: 1. Introduction. 2. Hazards and safety in High Voltage engineering 3. Examples of High Voltage Electrical Equipment 4. Physical aspects of common High Voltage Electrical Equipment failures 5. Basic diagnostics methods for High Voltage Apparatus 6. Contemporary Advanced Diagnostic Methods and Systems in application 7. Example of Electrical Equipment diagnostics – case study. Partial Discharges in power transformer. 8. Failure detection in High-Voltage electrical equipment (Connection Problems, Overloading, Design Defects, Moisture, Hotspots, Insulation degradation, etc…)	
Assessment methods: Written paper and presentation on the topic selected by student and accepted by lecturer. Course may be conducted in the eLearning form.	
Recommended reading: 1. Insulation of High-Voltage Equipment, Ushakov, V.Y., Springer-Verlag, Berlin 2004. 2. High Voltage Engineering Problems and Solutions, Begamudre, R.D., New Age International Pvt Ltd Publishers, 2010. 3. High-Voltage Test and Mesuring Techniques, Hauschild, W. ,Lemke, E., Springer-Verlag, Berlin 2014. 4. High Voltage Engineering. Practice and Theory, Vosloo, Wallace ; Holtzhausen, Koos , Sellenbosch, 2008.	

Return to list of courses

Course name: **Image Processing in Computer Forensics**	
Course code: E025	**Form of class:** Lecture, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Podpora Michał, m.podpora@po.opole.pl	
Prerequisites: English (min B1 level), Computer graphics (basics), Programming (any computer language)	
Objectives of the course and learning outcomes: - is able to deal properly with electronic evidence - has knowledge regarding basic techniques, tools and algorithms for image investigation (including Error Level Analysis and Hyperspectral Imaging) - is able to discover and describe: what operations/manipulations were made to a digital image by comparing two images in a graphical software (and present the results in a report) - is able to discover and describe: what operations/manipulations were made to a digital image by investigating only the final image using a professional forensic graphical software (and present the results in a report)	
Teaching program: - Digital image acquisition methods ; Quality of digital image - Basic modifications of digital image - Verification of the authenticity of digital image - Verification of the authenticity of printed documents - Hyperspectral imaging - Tools and methods for analysis of video streams As the project, a student should accomplish one exercise regarding digital image analysis case. The analysis should be accompanied by an operational report.	
Assessment methods: Lecture - written/test paper examination, Laboratory - laboratory report	
Recommended reading: [1] H. Farid, Photo Forensics, MIT Press, 2016 [2] Fotoforensics.com, Error Level Analysis tutorial, available on-line (2016-XII): http://fotoforensics.com/tutorial-ela.php [3] AmpedSoftware.com, Amped FIVE forensic video enhancement software, available on-line (2016-XII): https://ampedsoftware.com/five	

Return to list of courses

Course name: **Internet Technology**	
Course code: E026	**Form of class:** Lecture, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 3	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Paszkiel Szczepan, s.paszkiel@po.opole.pl	
Prerequisites: English (min B1 level), Basic knowledge about internet technology. Basic knowledge of HTML, CSS, PHP.	
Objectives of the course and learning outcomes: The graduate has a knowledge about the differences HTML 5, PHP, ASP, Ruby. The graduate knows internet technology.	
Teaching program: 1. HyperText Markup Language – HTML 5 2. Cascading Style Sheets - CSS 3. JAVAScript 4. Introduction to PHP 5. Introduction to MySQL 6. ASP.NET 7. MS SQL Server 8. New frameworks for internet technology	
Assessment methods: Presentation, coursework	
Recommended reading: •Jon Duckett, HTML and CSS: Design and Build Websites, 2011 •Jon Duckett, JavaScript and JQuery: Interactive Front-End Web Development, 2014 •Jennifer Robbins, Learning Web Design: A Beginner's Guide to HTML, CSS, JavaScript, and Web Graphics, 2012	

Return to list of courses

Course name: **Introduction to Algorithm Design**	
Course code: E027	**Form of class:** Lecture,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Paszkiel Szczepan, s.paszkiel@po.opole.pl	
Prerequisites: English (min B1 level), Basic English. Basic knowledge about algorithm.	
Objectives of the course and learning outcomes: The graduate has a knowledge about the algorithm design. The graduate can present the algorithm in many ways.	
Teaching program: 1. Introduction to algorithm design. Exercises in design flowcharts algorithms. Horner scheme. 2. The Euclidean algorithm. Recursion. Tower of Hanoi. Traveling salesman problem. Sieve of Eratosthenes. Fibonacci numbers. 3. Automata Design. Definition of regular languages using regular expressions. 4. Definition and design of regular grammars. 5. Theory of Algorithms. Study of the basic techniques of implementation of efficient algorithms. Divide and conquer algorithm. Greedy algorithm. 6. Sort stable and unstable, classification of sorts. 7. Algorithms for the Exploration of Graphs. 8. Fundamentals of cryptography, cipher Vernam, Shannon's theorem, RSA algorithm - key generation.	
Assessment methods: Presentation, coursework, oral test	
Recommended reading: Cormen T.H., Leiserson C.E., Rivest R.L., Introduction to Algorithms Aho, A. V., Hopcroft, J. E., Ullman, J. D., The Design and Analysis of Computer Algorithms Sedgewick R., Algorithms in C	

Return to list of courses

Course name: **Introduction to Computer Forensics**	
Course code: E028	**Form of class:** Lecture, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Podpora Michał, m.podpora@po.opole.pl	
Prerequisites: English (min B1 level), Computer's architecture, basics of operating systems	
Objectives of the course and learning outcomes: Student is able to deal properly with electronic evidence, is able to retrieve data/evidence from a device and present the results in a report, is able to recover deleted data/evidence from a device and present the results in a report.	
Teaching program: Operational work reports Retreiving volatile data Using specialized forensic hardware tools – forensic blockers Retrieving data/evidence from a device Recovering deleted data/evidence from a device	
Assessment methods: A student must accomplish three exercises/cases – of harddrive (or other media) analyses and one more complex case/analysis (requiring data recovery and some open intelligence activities). Each analysis should be accompanied by an exercise report and an operational work report.	
Recommended reading: Cowen D., "Computer Forensics, a Beginner's Guide", McGraw-Hill/Osborne Media, ISBN 9780071742450, 2013 Watson D., Jones A., "Digital Forensics Processing and Procedures: Meeting the Requirements of ISO 17020, ISO 17025, ISO 27001 and Best Practice Requirements", Syngress Publishing, ISBN 9781597497428, 2013	

Return to list of courses

Course name: **Introduction to Cybersecurity**	
Course code: E029	**Form of class:** Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Gola Mariusz, m.gola@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level)	
Objectives of the course and learning outcomes: By the end of this course, students will be able to protecting themselves against cyberattacks.	
Teaching program: The Introduction to Cybersecurity is designed for students who are considering IT as career with specialization in cybersecurity. This exploratory course provides the students an introduction to cybersecurity. The curriculum will explore ways to be safe online, learn the different types of malware and attacks, measures used by organizations to mitigate the attacks, and research their career opportunities. The curriculum is appropriate for students at many education levels and types. Students learn the basics of being safe online. Students are introduced to different types of malware and attacks, and how organizations are protecting themselves against these attacks. Students explore the career options in cybersecurity. The language used to describe cybersecurity concepts is designed to be easily understood by learners at all levels and embedded interactive activities help reinforce comprehension.	
Assessment methods: on-line tests	
Recommended reading: • Cybersecurity and Cyberwar: What Everyone Needs to Know® 1st Edition, P.W. Singer, Allan Friedman • CompTIA Security : Get Certified Get Ahead: SY0-401 Study Guide Paperback – October 25, 2014, Darril Gibson • Networking: A Beginner's Guide, Sixth Edition, Bruce Hallberg	

Return to list of courses

Course name: **Introduction to Networks**	
Course code: E030	**Form of class:** Lecture,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Gola Mariusz, m.gola@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level)	
Objectives of the course and learning outcomes: By the end of the course, students will be able to build simple LANs, perform basic configurations for routers and switches, and implement IP addressing schemes	
Teaching program: Introduces the architecture, structure, functions, components, and models of the Internet and computer networks. The principles of IP addressing and fundamentals of Ethernet concepts, media, and operations are introduced. Course describes: • the devices and services used to support communications in data networks and the Internet • the role of protocol layers in data networks • the importance of addressing and naming schemes at various layers of data networks in IPv4 and IPv6 environments • Build a simple Ethernet network using routers and switches • Use Cisco command-line interface (CLI) commands to perform basic router and switch configurations	
Assessment methods: on-line tests	
Recommended reading: • Computer Networking: A Top-Down Approach (7th Edition), James Kurose, Keith Ross • Computer Networks (5th Edition), Andrew S. Tanenbaum, David J. Wetherall • Networking: A Beginner's Guide, Sixth Edition, Bruce Hallberg	

Return to list of courses

Course name: **Microprocessors Technology**	
Course code: E034	**Form of class:** Lecture, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Szmajda Mirosław, m.szmajda@po.opole.pl	
Prerequisites: English (min B1 level), Basics of: Information Technology, C language, Electronics, Digital Electronics.	
Objectives of the course and learning outcomes: • Basics of microprocessors systematic. • Basics of microprocessor system work in general. • Introducing of chosen microcontroller (8051, MSP430,TMS320c28x or ARM). • Gathering information about implementation of chosen microcontroller in embedded systems.	
Teaching program: • Codes and arithmetic of codes used in microcontrollers. • Introducing following terms: microprocessors , microcontrollers, analogue microcontrollers, mixed-signal microcontrollers, digital signal controller, digital signal processor, system on a chip; IP cores, FPGA, embedded systems. • General architecture and operation of microprocessor systems. • Detailed information about chosen microcontrollers (8051, MSP430,TMS320c28x or ARM) including: CPU, instructions, assembler, memory map, interruption system, GPIOs, timers, serial ports, ADC, DAC, LCD drivers, IDE environment. • Basic information about creating microprocessors systems. • The "Microprocessor Technology - Lecture" is obligatory to take cooperating subject "Microprocessor Technology - Laboratory".	
Assessment methods: oral or written exam	
Recommended reading: • www.ti.com: MSP430 teaching ROM, • www.ti.com: TMS320c28x teaching ROM, • www.ti.com: application notes of MSP430 and TMS320c28x families • John H. Davies: MSP430 Microcontroller Basics, Elsevier 2008. • Nagy C.: Embedded Systems Design using the TI MSP430 Series. Elsevier, Burlington. Ball S.: Embedded Microprocessor Systems: Real World Design, Newnes, Burlington 2002	

Return to list of courses

Course name: **Perception in Autonomous Systems**	
Course code: E035	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Michalski Paweł, p.michalski@po.opole.pl	
Prerequisites: English (min B1 level), Python	
Objectives of the course and learning outcomes: This course is a broad introduction to autonomous systems.	
Teaching program: Topics include hardware types used in computer perceptions by autonomous cars example. Image manipulation methods like reconstruction, some low-level image processing, and high-level vision tasks like image classification and object detection. Perception systems based on fusion of data	
Assessment methods: group project paper report, presentation	
Recommended reading: Multi-Sensor Data Fusion: An Introduction - H.B. Mitchell Data Fusion Methodology and Applications - Marina Cocchi Image Processing: Methods, Applications	

Return to list of courses

Course name: **Photovoltaic systems**	
Course code: E037	**Form of class:** Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Górecki Krzysztof, k.gorecki@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level), Basic knowledge about the electrical engineering. Basic knowledge of electrical industry.	
Objectives of the course and learning outcomes: As a result of the course student should know: detail knowledge of projecting grid on and grid off solar systems (mechanical construction and electrical calculations), economic analysis.	
Teaching program: Solar energy. Photovoltaic cells – technology of productions and utilization. Solar inverters. Projecting of grid-connected photovoltaic power system and grid off solar systems. Projecting grid on and grid off solar systems. Efficiency of solar inverters and components of solar systems. Calculations of cost-effective projects. Data loggers in solar systems. Analyzing data from data loggers. Measurements of parameters of solar systems.	
Assessment methods: 2 projects	
Recommended reading: • Solar Cells and their Applications Second Edition, Lewis Fraas, Larry Partain, Wiley, 2010, ISBN 978-0-470-44633-1 , Section10.2. • "Grid Connected PV Systems". Acmepoint Energy Services. Retrieved 28 April 2015. • "Grid Connected Solar Electric - Photovoltaic (PV) Systems". powernaturally.org. Retrieved 2011-07-21. • "Summary Report on the DOE High-tech Inverter Workshop" (PDF). Sponsored by the US Department of Energy, prepared by McNeil Technologies. eere.energy.gov. Archived from the original (PDF) on 2012-02-27. Retrieved 2011-06-10.	

Return to list of courses

Course name: **Power Electronics I**	
Course code: E041	**Form of class:** Lecture, Seminar,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Beniak Ryszard, r.beniak@po.opole.pl	
Prerequisites: English (min B1 level), Basic knowledge of physics, mathematics and electrical engineering is required, in particular: the ability to integrate and solve elementary differential equations, the ability to interpret equations and use complex numbers.	
Objectives of the course and learning outcomes: An understanding of the principles of power electronic converters. An understanding of power electronics devices and their application in power electronic converters. An understanding of the application of power electronic converters in the management of electrical energy. Additionally ability to analyze and synthesize simple power electronic converters and systems.	
Teaching program: • Fundamentals of current conduction in solids, semiconductors structure. • Semiconductor components: semiconductor diodes, thyristors, field-effect transistors and insulated gate bipolar transistors. • Line-commutated rectifiers: system components for rectification, single-pulse rectifier with resistive and inductive loads, current and voltage value. Two-pulse rectifier, centres tap and bridge in rectifier and inverter operation. Three-pulse rectifier end six-pulse rectifier. • Operational behaviour of line-commutated rectifiers: operation and power chart, active pow-er, apparent power and reactive power; power charts, harmonic analysis. • Self-controlled converter. The function of d.c. choppers (step down chopper and step up chopper) end self-controlled inverters (inverter with voltage source d.c. link and inverter with current source d.c. link) are explained.	
Assessment methods: Oral and course work	
Recommended reading: • Power Electronics - Converters Applications and Design (Recommended reading), Author: Mohan, T M Undeland and WP Robbins, Notes: Wiley • Introduction toModern PowerElectronics, Author: Andrzej M. Trzynadlowski , Notes: Wiley • Power Electronics Handbook, Edited by Muhammad H. Rashid, Notes ELSEVIER	

Return to list of courses

Course name: **Programming Essentials in Python**	
Course code: E042	**Form of class:** Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Gola Mariusz, m.gola@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level), No prior programming knowledge is required	
Objectives of the course and learning outcomes: The main goal of the courses is to guide you from a state of complete programming illiteracy to a level of programming knowledge which allows you to design, write, debug, and run programs encoded in the Python language, and to understand the basic concepts of software development technology.	
Teaching program: Python is a general-purpose programming language used to build just about anything. Python is key for backend web development, data analysis, artificial intelligence and scientific computing, all of which are key for pursuing IT careers. The course begins with the very basics guiding you step by step until you become adept at solving more complex problems. Course outline: • Introduction to Python and computer programming • Data types, variables, basic input-output operations, basic operators • Boolean values, conditional execution, loops, lists and list processing, logical and bitwise operations • Functions, tuples, dictionaries, and data processing • Modules, packages, string and list methods, and exceptions • The object-oriented approach: classes, methods, objects, and the standard objective features; exception handling, and working with files	
Assessment methods: on-line tests	
Recommended reading: • Head First Python: A Brain-Friendly Guide, Paul Barry, O'Reilly Media; 2nd edition (December 13, 2016). • Python Crash Course, 2nd Edition: A Hands-On, Project-Based Introduction to Programming, Eric Matthes, No Starch Press, No Starch Press. • Learning Python, 5th Edition, Mark Lutz, O'Reilly Media; Fifth edition (July 16, 2013)	

Return to list of courses

Course name: **Programming Graphic Aplications**	
Course code: E043	**Form of class:** Lecture, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Kamiński Marcin, m.kaminski@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level), Basic programming skills in any programming language	
Objectives of the course and learning outcomes: A basic course presenting the basic algorithms of vector graphics and bitmap graphics implemented in JavaScript	
Teaching program: A basic course in programming graphic applications implemented in the JavaScript programming language. The course discusses the basics of algorithms used in the procedures of creating and processing graphics. The practical effect of the course are applications implemented in the JavaScript programming language and presenting the effects of their operation on the website. For the effective implementation of the examples, only a web browser and a code editor selected by the student are necessary.	
Assessment methods: Student’s work during problem solving computer laboratories and written exam	
Recommended reading: • Digital Image Processing, Richard E. Woods Rafael C. Gonzales, Pearson, 2018 • Vector Basic Training: A Systematic Creative Process for Building Precision Vector Artwork, Von Glitschka, New Riders Pub, 2015 • JavaScript: The Definitive Guide: Master the World's Most-Used Programming Language, by David Flanagan, O'Reilly Media, 2020	

Return to list of courses

Course name: **Programming II**	
Course code: E044a	**Form of class:** Lecture, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** February
Number of hours per week: 4	**Number of hours per semester:** 60
Language of instruction: English	
Name of the lecturer and contact information: Wajnert Dawid, d.wajnert@po.opole.pl	
Prerequisites: English (min B1 level), BBasic knowledge of structural programming in C	
Objectives of the course and learning outcomes: The graduate has a knowledge about objected-oriented programming in C	
Teaching program: 1. Introduction to object oriented programming in C . 2. Classes, objects, constructors and destructors. Static methods 3. Inheritance. Basics, application and implementation. Virtual methods. Class hierarchy. 4. Abstract methods and classes. Interfaces. 5. Polymorphism: overloading functions and operators. 6. Exception handling. 7. Input/output operations in C . 8. STL library: containers, adapters, iterators, algorithms.	
Assessment methods: Lecture – written test. Laboratory – practical classes assessment.	
Recommended reading: Eckel Bruce, Thinking in C , Volume 1: Introduction to Standard C , Pearson Education (US), 2003 Eckel Bruce, Thinking in C , Volume 2: Standard Libraries	

Return to list of courses

Course name: **Programming III**	
Course code: E044b	**Form of class:** Lecture, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October
Number of hours per week: 4	**Number of hours per semester:** 60
Language of instruction: English	
Name of the lecturer and contact information: Wajnert Dawid, d.wajnert@po.opole.pl	
Prerequisites: English (min B1 level), Basic knowledge of the structural programming	
Objectives of the course and learning outcomes: The graduate has a knowledge about C# programming language	
Teaching program: 1. Introduction to the .NET platform. 2. C# programing language: input/output basics, comments, compilation, data types, instruction types, decision making, loops, namespace. 3. Structures, objects and classes in C#: attributes, methods, constructors, destructors, access modifiers, indexers, class inheritance, polymorphism, delegates, events, operators. 4. Collections in C#. 5. Files handling in C#. 6. Development of Windows Presentation Foundation (WPF) applications.	
Assessment methods: Lecture – written test. Laboratory – practical classes assessment.	
Recommended reading: Liberty J., Programming C#, O'Reilly Media, USA, 2008. Griffiths I., Programming C# 8.0, O'Reilly Media, USA, 2019. Sam N., Bourton S., Jones A., WPF Recipes in C# 2008, Apress, 2008.	

Return to list of courses

Course name: **Software Engineering**	
Course code: E045	**Form of class:** Lecture, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Paszkiel Szczepan, s.paszkiel@po.opole.pl	
Prerequisites: English (min B1 level), Basic knowledge of software engineering. Basic knowledge of UML.	
Objectives of the course and learning outcomes: The graduate has a knowledge about the differences between development methodology frameworks. The graduate knows Unified Modeling Language.	
Teaching program: 1. Business processes, information systems - the role of engineering software 2. Introduction to the development of business applications 3. Design and implementation of the business layer 4. Design and implementation of the persistence layer 5. Requirements specification, analysis, modeling and design as the primary stages of construction systems. Life cycle models (the system) software 6. Object modeling of business processes and information systems 7. UML modeling language, Scrum 8. Software development tools 9. Validation and testing of software 10. Project management programming 11. Design and implementation of the service layer and Cloud Computing	
Assessment methods: The assessment of the student’s work will written examination and finished project. The project has to be ready by the end of the semester.	
Recommended reading: Tom Pender: UML Bible. John Wiley	

Return to list of courses

Course name: **Specialized Programming Languages**	
Course code: E046	**Form of class:** Lecture, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Kamiński Marcin, m.kaminski@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level), Basic programming skills in any programming language	
Objectives of the course and learning outcomes: Introductory level course of selected specialized programming languages leading to practical skills of their use	
Teaching program: • Python programming language: types and operators, statements and syntax, functions, modules, text and binary files, databases, Python's support for regular expressions, graphical user interface(Tkinter), Python extensions: VPython, Numerical Python, etc. • LaTeX – document preparation system: input files, layout of the document, typesetting text, international language support, environments, typesetting mathematical formulae, inserting graphics, presentation tools (Beamer class). • ImageMagick – image processing environment: basic and advanced image transformations, using drawing commands, image conversions, batch processing	
Assessment methods: Student's work during problem solving computer laboratories and written exam	
Recommended reading: Mark Lutz: Learning Python, O'Reilly Media Inc., 2007 Leslie Lamport: LaTeX – A Document Preparation System, Addison-Wesley, 1994. Michael Still: The Definitive Guide to ImageMagick, Apress, 1005	

Return to list of courses

Course name: **Statistical Inference and Operational Research**	
Course code: E047	**Form of class:** Lecture, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Paszkiel Szczepan, s.paszkiel@po.opole.pl	
Prerequisites: English (min B1 level), Basic knowledge of statistical. Basic knowledge of operational research.	
Objectives of the course and learning outcomes: The graduate has a knowledge about the statistic and optimization. The graduate knows operation research.	
Teaching program: 1. Statistical inference 2. Hypothesis Testing 3. Tests for the mean of a normal population, for the difference of means of two populations 4. Regression and Correlation 5. Simple Linear Regression 6. Correlation coefficient and determination 7. Hypothesis testing the parameters of the regression model 8. Operations research 9. Graphical resolution of linear programming problems 10. The method and dual simplex method 11. Methodology simplex and interpretation 12. Problems with artificial variables 13. The allocation algorithm	
Assessment methods: Presentation, coursework, project	
Recommended reading: Statistical Inference, G. Casella, R. L. Berger, 2001, Second Edition Operation Research, A. P. Verma, 2009, S.K. Kataria	

Return to list of courses

Course name: **Switching, Routing, and Wireless Essentials**	
Course code: E048	**Form of class:** Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Gola Mariusz, m.gola@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level) , Computer Networks Basics	
Objectives of the course and learning outcomes: Students learn key switching and routing concepts. By the end of this course, students will be able to perform basic network configuration and troubleshooting, identify and mitigate LAN security threats, and configure and secure a basic WLAN.	
Teaching program: The course focuses on switching technologies and router operations that support small-to-medium business networks and includes wireless local area networks (WLAN) and security concepts. Students learn how to configure a router and a switch for basic functionality Course describes: • Device Configuration • Switching Concepts • Implement VLANs and trunking in a switched network,Inter-VLAN Routing • Spanning Tree Protocol • EtherChannel • DHCPv4 Implement • FHRP Concepts and implementation • LAN Security Concepts and Switch Security Configuration • WLAN Concepts and Configuration • Routing Concepts and IP Static Routing	
Assessment methods: on-line tests	
Recommended reading: • Computer Networking: A Top-Down Approach (7th Edition), James Kurose, Keith Ross • Computer Networks (5th Edition), Andrew S. Tanenbaum, David J. Wetherall • Networking: A Beginner's Guide, Sixth Edition, Bruce Hallberg	

Return to list of courses

Course name: **System programming: Concurrent and Distributed Systems**	
Course code: E049	**Form of class:** Lecture,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Paszkiel Szczepan, s.paszkiel@po.opole.pl	
Prerequisites: English (min B1 level), Basic English. Basic knowledge of programming.	
Objectives of the course and learning outcomes: The graduate has a knowledge about the system programming. The graduate can present concuerrent and distributed systems.	
Teaching program: 1. Introduction to concurrent programming. 1.1. Basic concepts and motivation. 1.2. Mutual exclusion and synchronization. 1.3. Properties of concurrent systems. Check. 2. Synchronization in shared memory systems. 2.1. Basic algorithms of mutual exclusion in systems with shared memory. 2.2. Monitors as a high level mechanism. 3. Passing messages. 3.1. Basic mechanisms in systems based on message passing. 3.2. Models and languages of distributed programming. 3.3. High level mechanisms in distributed systems. 3.4. RPC and RMI. 4. Techniques for the design of real-time systems. 4.1. Real time system concept. Measures of time and task model. 4.2. Planning of periodic tasks with prioritization. 4.3. General and specific tasks models.	
Assessment methods: Presentation, coursework, oral test	
Recommended reading: Andrews, G. R., Foundations of Multithreaded, Parallel, and Distributed Programming, 2000 Aho, A. V., Hopcroft, J. E., Ullman, J. D., The Design and Analysis of Computer Algorithms Peleg D., Distributed Computing: A Locality-Sensitive Approach, 2000	

Return to list of courses

Course name: **User Experience Design**	
Course code: E050	**Form of class:** Lecture, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Dzierżanowski Łukasz, l.dzierzanowski@po.opole.pl	
Prerequisites: English (min B1 level), Knowledge of creating websites.	
Objectives of the course and learning outcomes: Introduction to the subject of UX / UI. Presentation of issues related to the research, analysis and design of useful websites.	
Teaching program: Introduction to UX, history of UX User-oriented design Research methods in UX The role of the UI in the UX project Psychology in design	
Assessment methods: Presentation of the project for the assessment, written test	
Recommended reading: S. Krug, Don't Make Me Think S. Weinschenk, 100 Things Every Designer Needs to Know About People J.J. Allen, J.J. Chudley, Smashing UX Design: Foundations for Designing Online User Experiences	

Return to list of courses

Course name: **Work safety and ergonomic**	
Course code: E051	**Form of class:** Lecture,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Kunicki Michał, m.kunicki@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level)	
Objectives of the course and learning outcomes: This course focuses on the principles and applications of ergonomics and the health and safety in the work environment. The course investigates knowledge about safety at work and different environment and ergonomics, with the particular consideration on the specificity of computer engineer work and the computer workstations. It also covers the concepts of how to prevent work related disorders.	
Teaching program: 1. Fundamentals of ergonomics and safety at work – definitions, general concepts. 2. Ergonomics principles in general and with reference to the work environment of the computer engineer 3. Overview of the most important national and EU regulations relating to occupational safety 4. Health and safety in work place - typical hazards, occupational risk, preventive health protection 5. Fundamentals of the work physiology and anthropometry regarding the ergonomics and work safety 6. Fundamentals of the first aid (basic life support)	
Assessment methods: written/test paper examination	
Recommended reading: 1. Hughes P., Ferrett E., Introduction to Health and Safety at Work, Oxford, Elsevier Science 2009 2. Dul J., Weerdmeester B., Ergonomics for beginners, London 2001 3. Andrew S. Nicholson John E. Ridd, Health, Safety and Ergonomics, Butterworth-Heinemann, 1998 4. Stranks J., Safety at Work. Key terms, Oxford, Elsevier Science 2006	

Return to list of courses

Course name: **Mechanics**	
Course code: M001	**Form of class:** Lecture, Group tutorial, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Kowalski Mateusz, m.kowalski@po.opole.pl	
Prerequisites: English (min B1 level), ---	
Objectives of the course and learning outcomes: Information to be provided by the lecturer	
Teaching program: Teaching program includes a basic knowledge of analytical mechanics: statics, kinematics and dynamics of the particle and particle system. Equilibrium of plane and spatial systems (determination of unknown support quantities. Static analysis of beams, pillars, frames and frameworks. Kinematics and foundations of rigid body dynamics. Resultant motion. Coriolis acceleration. Typical case studies i.e. : loaded beams, bars, sections, plates and systems. Real-world applications include basic properties of engineering constructions will be discussed.	
Assessment methods: Test, calculations, coursework	
Recommended reading: 1.Bogdan Skalmierski: Mechanics, Warszawa ; Amsterdam, Elsevier, 1992. 2.W. L. Cleghorn: Mechanics of Machines, New York: Oxford University Press, 2005. 3.Roger T. Fenner: Mechanics of Solids, Oxford, Blackwell Scientific Publ., 1989.	

Return to list of courses

Course name: **Machine Design**	
Course code: M002	**Form of class:** Lecture, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 4	**Number of hours per semester:** 60
Language of instruction: English	
Name of the lecturer and contact information: Owsiński Robert, r.owsinski@po.opole.pl	
Prerequisites: English (min B1 level), Mechanics, strength of materials, graphics	
Objectives of the course and learning outcomes: Information to be provided by the lecturer	
Teaching program: Theory of machines – some chosen problems. Fundamentals of structure theory. Fundamentals of fatigue strength and fatigue calculations. Elements of tribology. Joints. Pipelines and valves. Flexible elements. Shafts and axles. Couplings. Brakes. Mechanical transmissions. Operation and reliability of machine and devices. Algorithms of designing. Fundamentals of optimization. Simulation of mechanical systems in machine building – digital simulation. Engineering data bases. Advanced methods of computer-aided designing (CAD).	
Assessment methods: Project	
Recommended reading: 1. J.K. Gupta, R.S. Khurmi; Machine Design 2. R.S. Khurmi; Theory of Machines 3. A. D. Deutschman, W. J. Michels, C. E. Wilson; Machine Design; Theory and Practice	

Return to list of courses

Course name: **Machine Life**	
Course code: M003	**Form of class:** Lecture, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Kurek Andrzej, a.kurek@po.opole.pl Kurek Marta, ma.kurek@po.opole.pl	
Prerequisites: English (min B1 level), Knowledge of mechanics, strength of materials	
Objectives of the course and learning outcomes: Student will have a detailed knowledge of the fatigue of materials and exploitation of machines and constructions. Student will be able to assess the consequences of failure in the operation process.	
Teaching program: Determination of standard fatigue characteristics. Determination of the cyclic strain curve and its modelling with the Ramberg-Osgood equation. Investigations of notch influence on fatigue life of elements under simple loadings. Schematization of random histories of service loadings, damage accumulation and fatigue life calculations. Determination of fatigue life of welded joints under simple loadings. Simulation of service loadings with the computer generator of random signals. Determination of fatigue life under constant-amplitude and random loadings with mean stresses. Fatigue life of materials under constant-amplitude bending and torsion with phase displacement. Investigations of notch influence on fatigue life under complex loadings. Investigations of influence of correlation between stress state components on fatigue life. Determination of fatigue life of welded joints taking into account the fictitious notch radius. Determination of the expected position of the fatigue fracture plane with the damage accumulation method. Determination of fatigue life with the spectral method. Fatigue tests under polyharmonic loadings.	
Assessment methods: Individual project paper report and presentation	
Recommended reading: 1.Carl C. Osgood: Fatigue Design / Carl C. Osgood. - Ed.2. - Oxford [i in.] : Pergamon Press, 1982. - IX, 606 s. (International Series on the Strength and Fracture of Materials and Structures. Pergamon International Library of Science, Technology, Engineering and Social Stuies) 2.Darrell F. Socie, Gary B. Marquis: Warrendale Multiaxial Fatigue: Society of Automotive Engineers, 2000. 3.Vladimir V. Bolotin: Mechanics of Fatigue, New York , CRC Press, 1999.	

Return to list of courses

Course name: **Materials science**	
Course code: M004	**Form of class:** Lecture, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Andrzejewski Dariusz, d.andrzejewski@po.opole.pl	
Prerequisites: English (min B1 level), Basic knowledge about materials and structures used in Mechanical Engineering	
Objectives of the course and learning outcomes: The basic mechanical and technical properties of metals, amorphous materials, synthetics materials. Methods for proper bonding materials and choice of materials depending on the application	
Teaching program: 1. The structure and properties selected steels. 2. The structure and properties cast iron. 3. The structure and properties alloys aluminium. 4. The structure and properties alloys copper. 5. The effect of alloying elements on the properties of metals. 6. Transformation in the structure during heating and cooling. 7. Corrosion of materials. 8. The structure and properties composite materials. 9. Different methods of joining materials. 10. Explosion welding. 11. Materials and method of operation and comparison of solar electric and liquid solar panels. 12. Shadow coefficient construction. 13. Geothermal heating and the materials used to construction. 14. Termoisolation used in engineering barrier. 15. Free energy it is possible?	
Assessment methods: Thematic presentation, active participation in laboratory classes	
Recommended reading: 1.William D.Callister, David G.Rethwisch: Material Science and Engineering, Publisher: Wiley; 9 edition (December 4, 2013) 2.William D.Callister, David G.Rethwisch: An Introduction, Publisher: Wiley, 2010 3.George Stuart Brady, Henry R. Clauser, John A. Vaccari: Materials Handbook, Publisher: McGraw-Hill Education; 15th edition (July 9, 2002) 4.Michael F. Ashby, David R H Jones: Engineering Materials Volume 1, Publisher: Butterworth-Heinemann Ltd; 2nd Revised edition edition (1 Oct. 1996) 5.John Martin: Materials for Engineering, Publisher:CRC Press; 3 edition (July 7, 2006)	

Return to list of courses

Course name: **Strength of Materials**	
Course code: M005	**Form of class:** Lecture, Group tutorial, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Böhm Michał, m.bohm@po.opole.pl	
Prerequisites: English (min B1 level), Knowledge of mechanics	
Objectives of the course and learning outcomes: Information to be provided by the lecturer	
Teaching program: State of stresses and shifts of beams and bars. Kinematics and foundations of rigid body dynamics. Permissible stresses. Limiting load capacity and relations between the stress and strain states. Strength hypotheses. Analysis of strength of machine elements. Linear-elastic systems. Loss of stability of bar systems. Strength analysis of thin-walled plates and shells.	
Assessment methods: Test, calculations and experiment	
Recommended reading: 1.B. Skalmierski: Mechanics and strength of materials, Elsevier New York, 1979 2.T.Kobayashi: Strength and Toughness of Materials, Springer Verlag, Japan 2004 3.V. D. Silva: Mechanics and Strength of Materials, Springer Verlag. Berlin- Heidelberg 2006	

Return to list of courses

Course name: **Mechanics Elements and Machines Design**	
Course code: M006	**Form of class:** Lecture, Seminar,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Owsiński Robert, r.owsinski@po.opole.pl	
Prerequisites: English (min B1 level),	
Objectives of the course and learning outcomes: information to be provided by the lecturer	
Teaching program: Mechanics of elements. Theory of machines – some chosen problems. Machines' design. Fundamentals of structure theory. Fundamentals of fatigue strength and fatigue calculations. Elements of tribology. Joints. Pipelines and valves. Flexible elements. Shafts and axles. Couplings. Brakes. Mechanical transmissions. Operation and reliability of machine and devices. Algorithms of designing. Fundamentals of optimization. Simulation of mechanical systems in machine building – digital simulation. Engineering data bases. Advanced methods of computer-aided designing (CAD).	
Assessment methods: Project	
Recommended reading: 1.J.K. Gupta, R.S. Khurmi; Machine Design 2.R.S. Khurmi; Theory of Machines 3.J.E. Shigley, C. R. Mischke; Standard Handbook of Machine Design	

Return to list of courses

Course name: **Structural Mechanics in Machine Design**	
Course code: M007	**Form of class:** Lecture, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Kowalski Mateusz, m.kowalski@po.opole.pl	
Prerequisites: English (min B1 level), Basic of mathematics (high school level)	
Objectives of the course and learning outcomes: This course focuses on the fundamentals of structure and designing and bonding that underpin materials science. It is the introductory lecture class for students interesting in Materials Science and Engineering.	
Teaching program: Models of materials; materials phenomena, such as creep, relaxation, and fatigue; geometry of the motion and/or deformation of the structure, and conditions of geometric fit, forces on and within structures and assemblages; physical aspects of the structural system (including material properties) which quantify relations between the forces and motions/deformation. Typical case studies: loaded beams, bars, sections, plates and systems. Real-world applications include engineered alloys will be discussed; materials used in modern designing, typical structures and loading conditions, typical machine parts, strength of components. - other themes prepared by lecturer	
Assessment methods: Written work, active participation in laboratory classes, project	
Recommended reading: 1.Hjelmstad K.D.: Fundamentals of Structural Mechanics, Springer Science 2005. 2.Sundararajan C.: Probabilistic Structural Mechanics Handbook : Theory and Industrial Applicationa ,ed. C. Sundararajan. - New York [i in.] : Chapman	

Return to list of courses

Course name: **Simulation in Machine Dynamics**	
Course code: M008	**Form of class:** Lecture, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October
Number of hours per week: 3	**Number of hours per semester:** 45
Language of instruction: English	
Name of the lecturer and contact information: Owsiński Robert, r.owsinski@po.opole.pl	
Prerequisites: English (min B1 level), Mathematical analysis, analytical mechanics, theory of vibrations fundamentals	
Objectives of the course and learning outcomes: Mathematical modeling and computer simulation of linear and nonlinear mechanical systems with one and more degrees of freedom using Matlab-Simulink programme	
Teaching program: - Introduction to Matlab-Simulink programme, numerical methods in Matlab, - Differential equations modeling methods using Simulink programme, - Simulation and modeling of linear mechanical systems using general and operational methods, - Simulation and modeling of nonlinear mechanical systems using general method, - Transfer function concept for linear mechanical systems with one and more degrees of freedom, frequency characteristics of the linear systems, - Application of FFT or DFT functions for frequency characteristics determination of the nonlinear mechanical systems, - Movement stability analysis for linear and nonlinear mechanical systems	
Assessment methods: reports written by students	
Recommended reading: a)B.Skalmierski, Mechanics, Warszawa-Amsterdam, PWN-Elsevier 1992. b)J.L.Meriam, L.G.Kraige, Engineering Mechanics, vol.2 Dynamics, 3rd ed.- New York: John Wiley	

Return to list of courses

Course name: **Steel Structures**	
Course code: M009	**Form of class:** Lecture, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Kurek Andrzej, a.kurek@po.opole.pl	
Prerequisites: English (min B1 level), Knowledge of mathematics, mechanics and strength of materials	
Objectives of the course and learning outcomes: After this course students will be familiar with the subject of steel structures. The students will have an understanding of the behavior of steel elements under structural loading. Will be able to design primary steel structural elements of a building and their connections.	
Teaching program: Introduction, Material Properties, Design Process. Tension Members: strength, failure modes, design. Compression Members: critical strength, compactness. Compression Members: effective length and design. Beam: Section analysis and flexural strength. Beam: Shear strength and serviceability. Design of Beams; Beam-Column Interaction. Project of a steel structure.	
Assessment methods: Individual project paper report	
Recommended reading: 1.Piotr Iwicki: Selected problems of stability of steel structures,Gdańsk, Wydawnictwo Politechniki Gdańskiej, 2010. 2.Rolf Kindmann, Matthias Kraus: Steel structures: design using FEM, Berlin, Wilhelm Ernst	

Return to list of courses

Course name: **Welding**	
Course code: M010	**Form of class:** Lecture, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Blacha Łukasz, l.blacha@po.opole.pl	
Prerequisites: English (min B1 level), Strength of materials	
Objectives of the course and learning outcomes: The course consists of individual work (project) aimed at the design of typical welded joints that will undergo a certain number of work cycles (i.e. acceptably immune to fatigue damage).	
Teaching program: At the beginning of the course, the ways of standardized fatigue assessment of welded joints are introduced. Following, the calculation methods and algorithms are presented and practically applied. Based on the material presented and individually reviewed, each student is obliged to write a project concerning determination of number of load cycles to failure. Specifically, the course is organized over five blocks: 1)Basic lifetime prediction methods 2)Recommendations and guides regarding typical fatigue calculations 3)Calculation schemes 4)Individual work 5)Assessment / grades	
Assessment methods: Final grade will depend from the quality of the written individual project.	
Recommended reading: 1)Hobbacher A.: Recommendations for fatigue design of welded joint and components. International Institute of Welding, IIW document XIII-2151r4-07/XV-1254r4-07, Paris, 2008. 2)EN 1993-1-9 (2005) (English): Eurocode 3: Design of steel structures - Part 1-9: Fatigue. 3)EN 1999-1-3 (2007) (English): Eurocode 9: Design of aluminium structures - Part 1-3: Structures susceptible to fatigue. 4)American Bureau of Shipping (ABS): Guide for fatigue assessment of offshore structures. ABS, Houston, 2003.	

Return to list of courses

Course name: **Hydraulic Machines**	
Course code: M011	**Form of class:** Lecture, Group tutorial, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 3	**Number of hours per semester:** 45
Language of instruction: English	
Name of the lecturer and contact information: Wydrych Jacek, j.wydrych@po.opole.pl	
Prerequisites: English (min B1 level), Mathematics, Measurement and Instrumentation.	
Objectives of the course and learning outcomes: This course introduces the working principles of fluid machines such as pumps and turbines. It's aimed at developing an understanding, from a fluid-mechanics and thermodynamics point of view, how these devices work, performs and can be regulated.	
Teaching program: Introduction to the hydraulic machines. Hydraulic machines types: Turbines and pumps. Fundamentals of turbomachine theory: momentum principle applied to flow through a rotor; thrust on the rotor; torque exerted on the rotor; Euler equation for turbomachines; velocity triangles. Axial reaction turbines. Centrifugal pumps: impeller vanes design; diffuser design. Dimensionless parameters and similarity laws applied to the design.	
Assessment methods: Exam (test)	
Recommended reading: 1.R. Singal, M. Singal, R. Singal: Hydraulic Machines: Fluid Machinery, I.K. International PVT Ltd, 2009 2.R. Bansal: Fluid Mechanics and Hydraulic Machines, Laxmi Publications, 2010 3.Z. Hussian, Z. Abdullah, Z. Alimuddin: Basic Fluid Mechanics and Hydraulic Machines, CRC Press, 2009	

Return to list of courses

Course name: **Fluid Mechanics**	
Course code: M012	**Form of class:** Lecture, Group tutorial, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 4	**Number of hours per semester:** 60
Language of instruction: English	
Name of the lecturer and contact information: Borsuk Grzegorz, g.borsuk@po.edu.pl	
Prerequisites: English (min B1 level), ---	
Objectives of the course and learning outcomes: Main objective of the course is to give the students a strong background in fundamental laws of physics applicable in fluid mechanics, applications of fluid mechanics and current measurement techniques.	
Teaching program: Lectures/group tutorial Introduction - Fluid Statics - Conservation of mass and momentum - Bernoulli equation - Equations of motion in integral form - Equations of motion in differential form - Kinematics, vorticity, potential flow - Potential flow - Dimensional analysis - Viscous flows, exact solutions, pipe flow - Laminar boundary layers - Boundary layer solution methods - Turbulence - Turbulent internal and external flows Laboratory Flow Measurements and Calibration of Flow Meters - Reynolds Experiment and Estimation of the Critical Reynolds Number - Unsteady Flow Through an Orifice - Potential Flow - Determination of Energy	
Assessment methods: Exam (test).	
Recommended reading: 1.Gerhart P.M. Fundamentals of Fluid Mechanics, Addison-Wesley Publishing Company, New York 1992 2.R. Bansal: Fluid Mechanics and Hydraulic Machines, Laxmi Publications, 2010 3.Z. Hussian, Z. Abdullah, Z. Alimuddin: Basic Fluid Mechanics and Hydraulic Machines, CRC Press, 2009	

Return to list of courses

Course name: **Technology of manufacturing**	
Course code: M013	**Form of class:** Lecture, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Żak Krzysztof, k.zak@po.opole.pl	
Prerequisites: English (min B1 level), ---	
Objectives of the course and learning outcomes: Main objective of the course is to give the students a strong background in technology especially in the area of machining processes and globally manufacturing of machine pieces.	
Teaching program: - Casting, Forming - Sheet Metal Processing - Basic information of Cutting Process - Cutting Process Models and Analysis, - Process Planning, - Joining, - Surface Treatment - Non-traditional processes - Micro- and nano-manufacturing.	
Assessment methods: Project, individual consultations	
Recommended reading: 1.Wit Grzesik: Advanced Machining Processes of Metallic Materials 2nd Edition, Elsevier, 2017 2.Mikell P. Groover: Principles of Modern Manufacturing, John Willey	

Return to list of courses

Course name: **Engineering Vibration Analysis of Mechanical Systems**	
Course code: M014	**Form of class:** Lecture, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English, German	
Name of the lecturer and contact information: Böhm Michał, m.bohm@po.opole.pl	
Prerequisites: English (min B1 level), Basic knowledge of mechanics. English or German.	
Objectives of the course and learning outcomes: The course is intended to give students a first degree level in understanding the principles and techniques involved in the analysis of vibrations and how they can also be applied to the analysis of mechanical systems dynamics.	
Teaching program: •Introduction to vibration analysis. •Vibration of mechanical systems with one degree of freedom. •Harmonic analysis, random vibrations, shock excitation. •Vibration of mechanical systems with more than one degree of freedom. •Mechanical systems with disturbed mass and elasticity. •Mechatronic vibration control systems.	
Assessment methods: Individual tasks to be calculated by the students, reports.	
Recommended reading: 1.J. Solnes: Stochastic processes and random vibrations theory and practice. John Wiley and Sons, West Sussex 1997 2.R.N. Jazar: Vibrations of thick cylindrical structures. Springer Verlag. New York 2010 3.V.A. Svetlitsky: Engineering vibration analysis. Springer Verlag. Berlin- Heidelberg 2004	

Return to list of courses

Course name: **Rapid prototyping**	
Course code: M015	**Form of class:** Laboratory, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Kurek Andrzej, a.kurek@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level), Experience in CAD.	
Objectives of the course and learning outcomes: The aim of the course is to familiarize the student with typical problems of designing and additive manufacturing process.	
Teaching program: This classes are focused on additive manufacturing process. Starting form understanding the technology trough designing adequate parts and finish on 3D printing those parts. The course consists of: • Additive manufacturing techniques, STL format, the difference between additive manufacturing techniques and conventional techniques • 3D printing technologies from solid materials (e.g. FDM) and resins (e.g. SLA, Polyjet) • Powder 3D printing technologies (DMLS, SLS) • Types of materials used in 3D printing and their mechanical properties • Designing elements ready for 3D printing in the appropriate software (e.g. Fusion360) • Printout of prepared elements • Post-processing of printed elements.	
Assessment methods: Report, project.	
Recommended reading: 1. Chee K. C., Kah F. L., Chu S. L., Rapid Prototyping: Principles and Applications; World Scientific, 2010 2. Sean Aranda, 3D Printing Failures: 2022 Edition: How to Diagnose and Repair ALL Desktop 3D Printing Issues, Independently Published, 2021, ISBN 9798784041258, pp. 338 3. Ben Redwood, Filemon Schöffer, Brian Garret: The 3D Printing Handbook: Technologies, design and applications Hardcover – November 14, 2017 ISBN-10. 9082748509, pp. 347	

Return to list of courses

Course name: **Finite element method**	
Course code: M016	**Form of class:** Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Owsiński Robert, r.owsinski@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level), Theoretical Mechanics	
Objectives of the course and learning outcomes: The purpose of the course is to present the finite element method, the methodology of working with computational tools, drawing conclusions from the analyses carried out and interpreting the results.	
Teaching program: The subject program includes such topics as: Introduction to the finite element method, learning to use computational tools (selected) for solving problems in the field: - linear elasticity - nonlinear mechanical problems - contact issues - modeling of bolted connections - complex analyses (e.g., thermo-mechanical) - modeling of hyper-elastic materials. The course program assumes the acquisition of the ability to independently verify the results obtained using FEM, critical analysis of the solution, and the ability to efficiently use a computational tool (selected computer program in the field of FEM)	
Assessment methods: individual/group projects	
Recommended reading: •Introduction to the Finite Element Method - Ottosen and Petersson •A First Course in Finite Elements - Fish and Belytschko •Bathe, K. J.: Finite Element Procedures. 2nd ed. Prentice Hall Inc. , 2014. •Chen X., Liu Y.: Finite Element Modeling and simulation with ANSYS Workbench, CRC Press, 2015	

Return to list of courses

Course name: **Computer Aided Design**	
Course available with minimum number of 4 participants.	
Course code: M017	**Form of class:** Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Pawliczek Roland, r.pawliczek@po.opole.pl	
Prerequisites: English (min B1 level), Fundamentals of informatics and descriptive geometry.	
Objectives of the course and learning outcomes: The objective of the CAD course is to make students familiar with professional program systems concerning designing of 3d models, analysis of the geometry of the object, generation of documents. Learning outcomes: student can use computer-aided design systems, use the tools for structural analysis and generate design documentation.	
Teaching program: CAD Graphic Environment CATIA: introduction to 3D modeling systems, types of documents. Basic components of user interface. Environment configuration. Object manipulation tools. Using sketches, profiles. Basic of geometry creation. Correlated dimensions. Geometrical constraints. Basic functions of 3D-solid creation: sketch based features (extraction of a profile, rotation about an axis). Model edition and modification. Assembly constraints and assembly analysis. Generation of technical documentation: views and projections, sections, details and other technics. Dimensioning and annotations.	
Assessment methods: Individual project	
Recommended reading: 1. Kirstie Plantenberg, Introduction to CATIA V5 Release 19, 2. Schroff Development Corporation (August 12, 2009) 3. http://blog.caddsoftsolutions.com/2011/09/catia-v5-basic-tutorial-pdf-free.html 4. CATIA help files	

Return to list of courses

Course name: **Statistics for Engineers**	
Course code: M018	**Form of class:** Lecture, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Tomaszewska-Wach Barbara, b.tomaszewska@po.edu.pl	
Prerequisites: English (min B1 level), English (min B1 level)	
Objectives of the course and learning outcomes: The students are able to collect and describe information about mass phenomena. On the basis of the collected data, they are able to make an analysis, draw conclusions and find regularities that occur in the investigated phenomena.	
Teaching program: Determination of characteristics of position series. Elaboration of distribution series and determination of their characteristics. Study into position, diversity, asymmetry and concentration measures. Graphical presentation of statistical material (development and interpretation of a histogram, frequency plot). Distributions and the central limit theorem (defining a random variable, finding binomial probabilities). Normal distribution (determination of density function, standardization). Determining the confidence interval for the mean based by application of a small and large sample. Theorems, tests and conclusions (formulation of hypotheses, calculation and interpretation of test statistics, drawing conclusions). Looking for relationships (creating and interpreting a scatter plot, correlation and regression). Spatial statistics.	
Assessment methods: Final test	
Recommended reading: 1. Springer handbook of engineering statistics, Susan L. Albon et al., Springer, 2006 2. Probability for dummies, Deborah J. Rumsey, For Dummies, 2006	

Return to list of courses

Course name: **Advanced CAD/CAE design**	
Course code: M019	**Form of class:** Laboratory,
Level of study: postgraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Owsiński Robert, r.owsinski@po.opole.pl	
Prerequisites: English (min B1 level), ---	
Objectives of the course and learning outcomes: Extend practical skills and knowledge related to selected problems of design with application of modern CAD/CAE tools.	
Teaching program: The course includes among other things: advanced 3D solid modelling and design parameterization, 3D surface design with application of reverse engineering, sheet metal design (SMD), structural finite element analysis (FEA), introduction to continuous fluid dynamics analysis (CFD), fluid- structure interaction (FSI) analysis, introduction to explicit dynamics (impacts) analysis.	
Assessment methods: Hands on training with application of industrial examples.	
Recommended reading: 1.T. Stolarski, Y. Nakasone, S. Yoshimoto, Engineering Analysis with ANSYS Software, Butterworth-Heinemann, 2007 2.S. Moaveni, Finite Element Analysis: Theory and Application with ANSYS, Prentice-Hall, 1999 3.Dassault Systemes, CATIA Version 5 Release 20 User's Documentation, 2009.	

Return to list of courses

Course name: **Dynamics of the vehicle**	
Course code: M020	**Form of class:** Lecture, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Brol Sebastian, s.brol@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level), Physics	
Objectives of the course and learning outcomes: Gaining skills in: application of vehicle force balance for steady, accelerated and decelerated movement; modeling of vehicle dynamics; drag forces modeling; driving forces modeling; vehicle movement analysis and; vehicle powertrain and body designing.	
Teaching program: Balance of the forces, driving forces, drag forces: grade, towing, rolling, aerodynamic, inertial, modeling of vehicle movement in steady state, in acceleration phase, deceleration phase, solving differential equations in order to achieve power, driving force, acceleration, distance in time charts, designing of selected vehicle parameters such as driving force course, aerodynamic properties, rolling drag. Testing of vehicles: on road tests, dynamometer tests, GPS, Power Acceleration And Force device aided tests.	
Assessment methods: Final report	
Recommended reading: Miliken and Miliken: Race Car Vehicle Dynamics Wolf-Heinrich Hucho: Aerodynamics of Road Vehicles Genta: Motor vehicle dynamics	

Return to list of courses

Course name: **Computer aided programming of the CNC machine tools**	
Course available with minimum number of 4 participants.	
Course code: M021	**Form of class:** Lecture, Laboratory, Seminar,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Bartoszuk Marian, m.bartoszuk@po.opole.pl	
Prerequisites: English (min B1 level), Basic knowledge about the machine tools, cutting tools, properties of workpiece and cutting materials, manufacturing processes	
Objectives of the course and learning outcomes: Preparation a control program for CNC machine tools based on the CAM software (for example Mastercam , Inventor CAM , GTJ, etc.)	
Teaching program: Theory of CNC machine tools. Type of machine tools and machining centres. Type of control systems. Type of CAM software s. Postprocessors. Methods of programming of CNC machine tools. Programming by using simulation softwares. Programming by using modern CAM software.	
Assessment methods: Practical classes assessment and individual project paper report	
Recommended reading: 1.Smid P.: CNC Programming Handbook, Industrial Press Inc., New York 2003. 2.Overby A.: CNC Machining Handbook: Building, Programming, and Implementation, Mcgraw-hill, 2010. 3.Crandell T.: CNC Machining and Programming: An Introduction, Industrial Press Inc., 2003. 4.Evans K.: Programming of CNC Machines Student Workbook, Industrial Pr, 2007.	

Return to list of courses

Course name: **Information Technology (IT) in Engineering**	
Course code: M022	**Form of class:** Lecture, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Kurek Andrzej, a.kurek@po.opole.pl	
Prerequisites: English (min B1 level), Basic knowledge in programming, basic knowledge in computer aided design.	
Objectives of the course and learning outcomes: Upon completing the course, the students will be able to deal with real-life IT problems occurring in designer work.	
Teaching program: This classes are focused on basic programming problems. Teaching programming in common languages used in engineering and science. Mostly on the example of MatLab and SciLab programs to do vast range of calculations and results plotting. Another part is the use of information technology in engineering and common IT problems in engineering. The curse program contains solving engineering and scientific problems. The matrix-based languages are the world's most natural way to express computational mathematics. Built-in graphics make it easy to visualize and gain insights from data. Common IT problems in engineering	
Assessment methods: Report, individual project paper raport	
Recommended reading: 1.Getting Started with MATLAB, version 6, The MathWorks (avaible online) 2.Peter I. Kattan: Matlab Guide to Finite Elements: an Interactive Approach, 2 ed. - Berlin Springer - Verlag, cop. 2007. 3.http://www.scilab.org/content/download/247/1702/file/introscilab.pdf	

Return to list of courses

Course name: **Graphical programming in mechatronic systems**	
Course code: M023	**Form of class:** Lecture, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Pawliczek Roland, r.pawliczek@po.opole.pl	
Prerequisites: English (min B1 level), Basic of informatics technology.	
Objectives of the course and learning outcomes: The aim of the course is to familiarize students with professional programming systems concerning the use of the idea of virtual instrument for solving problems generally understood mechatronic systems and control systems. Learning outcomes: student can build a simple measuring and control systems and create a program for the acquisition, processing and analysis of measurement data; student is able to handle systems of computer-aided design and analysis of operation of mechatronic systems.	
Teaching program: The idea of virtual instruments – LabVIEW environment for graphical programing. LabVIEW user interface. Basic of graphical programming: front panel, data types, controls and indicators ,functions, structures. Basic of data analysis. Measurement systems: data acquisition, analogue-digital conversion. Measurement problems: aliasing, spectrum leakage, filtering. Simulation module: differential equations, Laplace transform, transfer function, state vector, output vector. Control design module: modeling of the proportional, first and second order systems. Model interconnections. Structure of the control system. System response, characteristics. PID control system. Analysis of the stability of the system.	
Assessment methods: Coursework, individual project report.	
Recommended reading: 1. NI LabVIEW User Manual, www.ni.com 2.Ronald W. Larsen, LabVIEW for Engineers, Prentice Hall, 2011 3.LabVIEW help files	

Return to list of courses

Course name: **Combustion engines**	
Course code: M024	**Form of class:** Lecture, Laboratory, Seminar,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 4	**Number of hours per semester:** 60
Language of instruction: English	
Name of the lecturer and contact information: Hetmańczyk Ireneusz, i.hetmanczyk@po.opole.pl	
Prerequisites: English (min B1 level), Basic knowledge about combustion engine (building, steering, diagnostic, exploitation)	
Objectives of the course and learning outcomes: The basic technical properties of building combustion engine. Basic knowledge about materials and structures combustion engine. Improvement in the energy balance of combustion engines. Reduction of emission of harmful substances.	
Teaching program: 1. History of IC engines, two stroke and four stroke engines principle of operations. 2. Stroke ignition and compression ignition engines, external combustion engines, gas turbine. 3. Definitions and theoretical relations regarding for performance of IC engines. 4. Engine testing, methods of measuring experimental parameters in IC labs, (such as, tower, speed, air flow rate, Torque, fuel flow rate, pressure, Temperature, cycle pressure and volume, contraptions of CO2, CO, NOx , O2, NO and NO2 in the exhaust gas) and principles of measurements. 5. Heat transfer from in- cylinder contents to surrounding surface of the engine, principles and theoretical calculations. 6. Air standard cycle, air cycle, our- fuel cycle, Otto, Diesel and dual cycle. 7. Real cycles, ignition timing, injection timing, valve timing. 8. Super charge and turbo charging. 9. Fuels, alternative fuels, combustion, laminar and turbulent flame speeds. 10. Knock, octane no. and cetane no. 11. Fuel metering, carburetor and injection system, theoretical relations. 12. Ignition system, centrifugal and vacuum advances, principle of operations. 13. Friction and lubrication in IC engines. 14. Rotary (Wankel) engines their operations, advantages and disadvantages. 15. Homogeneous charge compression ignition engines, their operation, advantage and disadvantages. 16. Hybrid engines, different state of operation.	
Assessment methods: Laboratory reports, presentations	
Recommended reading: Combustion engines, Scientific Magazine, PL ISSN 0138-0346	

Return to list of courses

Course name: **Informatics**	
Course code: M025	**Form of class:** Lecture, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 4	**Number of hours per semester:** 60
Language of instruction: English	
Name of the lecturer and contact information: Spyra Andrzej, a.spyra@po.opole.pl	
Prerequisites: English (min B1 level), Working with computer	
Objectives of the course and learning outcomes: Upon completing the course, the students will be able to deal with real-life programming problems. The course will introduce programming concepts and many examples to explain the theoretical material, and includes many suggestions for practical use of the chosen programming language.	
Teaching program: 1.Introduction, The History of Computing, Data Storage and Manipulation, Operating Systems 2.Algorithms: The Concept of an Algorithm, Algorithm Representation, Algorithm Discovery, Iterative Structures, Recursive Structures, Efficiency and Correctness 3.Programming Languages: Historical Perspective, Traditional Programming Concepts, Procedural Units, Language Implementation, Object-Oriented Programming 4.Review of the chosen programming language (C , VBA, Python): Environment, Syntax, Data Types, Variables, Keywords, Operators, Decision, Loops, Numbers, Characters, Arrays, Strings, Functions and/or Procedures, File I/O 5.Programming examples	
Assessment methods: Individual project report, computer-based problem solving work, written test	
Recommended reading: 1.Brookshear, J. Glenn, Brylow D., Computer Science: An Overview. 12th Ed., Pearson, 2014 2.Wirth N., Algorithms Data Structures = Programs. Prentice Hall, 1978 3.Chapra S. C. Introduction to VBA for Excel. 2nd Ed., Pearson, 2009 4.Malik D.S., C Programming: From Problem Analysis to Program Design, 7th Ed., Cengage Learning, 2014 5.Materials prepared by lecturer.	

Return to list of courses

Course name: **Building Structures**	
Course code: M026	**Form of class:** Lecture, Group tutorial, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 5	**Number of hours per semester:** 75
Language of instruction: English	
Name of the lecturer and contact information: Kurek Andrzej, a.kurek@po.opole.pl	
Prerequisites: English (min B1 level), Knowledge of mathematics, mechanics and strength of materials	
Objectives of the course and learning outcomes: Student has knowledge of basic design elements engineering. Student is able to design the basic elements of mechanical engineering	
Teaching program: Some materials applied in building industry. General rules of building engineering. Elements of buildings, basic terms, kinds and aims: foundation trenches and foundations, walls and floors, roofs and draining of water, water, sewage and gas installations, stairs and communication systems. Loading of building structures. Connections of building structures. Constructional system and stiffness of the building. Building baffles and their requirements. Ventilation and combustion ducts. Constructions made of bricks, reinforced concrete, steel and wood. Technical specifications of building utilization.	
Assessment methods: Individual project paper report, test, presentations, laboratory	
Recommended reading: 1.Stanisław Fic: Building structures in theory and practice: Wydawnictwo Państwowej Szkoły Wyższej im. Papieża Jana Pawła II, 2013. 2.Tomasz Błaszczyński: Durability and repair of building structures Wrocław : Dolnośląskie Wydawnictwo Edukacyjne, 2010. 3.Wolfgang Schueller: High-Rise Building Structures, John Wiley	

Return to list of courses

Course name: **Information Technology**	
Course code: M027	**Form of class:** Lecture, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Łukasiewicz Ewelina, e.lukasiewicz@po.opole.pl Tomaszewska-Wach Barbara, b.tomaszewska@po.edu.pl	
Prerequisites: English (min B1 level), English (min B1 level)	
Objectives of the course and learning outcomes: The student is able to use information technologies tools such as a text editor, spreadsheet and learn how to generate presentations	
Teaching program: The scope of the course includes learning to use a text editor, use a spreadsheet and create presentations. The curriculum includes text editing and formatting, creating lists, tables of contents. Using a text editor to create tables and documents. Students learn how to use spreadsheets for creating calculations, developing charts, adding error bars and trend lines. Student also acquire skills in using various functions integrated into the spreadsheet. They find out how to create a presentation, add text, graphics to a presentation. Besides, the course covers the use of animations in presentations, etc. and work with the use of MS Office or Apache OpenOffice.	
Assessment methods: Final test	
Recommended reading: 1. "Microsoft Office 2016-Step by Step", Mirosoft Document 2. "Supported versions of the Office viewers". Microsoft. April 16, 2020 3. "Learn Microsoft Office 2019" Linda Foulkes, Packt Publishing, 2020, ISBN 9781839210617 3. The Apache OpenOffice Wiki, www.wiki.openoffice.org	

Return to list of courses

Course name: **Basic of Automatics**	
Course code: M028	**Form of class:** Lecture, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Brol Sebastian, s.brol@po.opole.pl Graba Mariusz, m.graba@po.opole.pl	
Prerequisites: English (min B1 level), Basics of mathematics and physics	
Objectives of the course and learning outcomes: Objectives: Gain knowledge about two and three state control, continuous control Outcomes: The Student can design two- and three state control system and tune it, additional the Student can handle and tune control systems using P, PI, PID controllers.	
Teaching program: This course focuses on basic automation systems, control solutions and identification methods. Additional computer aided methods of modeling are discussed and used. At the beginning short description of both logic control combinatory and sequential is explained and discussed followed by appropriate exercises made with use of Simulation software. Next, the computer aided modeling of plants and practical aspects of its identification will be explained. Finally control with open and closed loop is analyzed in context of use P, PI and PID controllers with emphasis on quality of control. The course will follow as pointed out below: - Basic of control systems - Logical combinatory control - Logical sequential control - Modeling of plant - Identification of plans - Control in open loop - Control in closed loop - P, PI, PID controllers - Quality of control - Adaptive control	
Assessment methods: Laboratory reports	
Recommended reading: 1.Materials prepared by lecturer 2.Shimon Y. (Ed.), Handbook of Automation, Springer ,2009, LXXVI, 1812p. With DVD.. 3.David W. Pessen, Industrial Automation: Circuit Design and Components, John Wiley	

Return to list of courses

Course name: **Basics of ecology**	
Course code: M029	**Form of class:** Lecture,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Kuczuk Anna, a.kuczuk@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level), fundamentals of chemistry and biology	
Objectives of the course and learning outcomes: Students get knowledge on basic ecological terms: ecology, species, population, ecosystem, biotic and abiotic elements of environment and relations between them Energy and matter in ecological systems, trophic chains. Additionally they wilg et information on examples of chosen ecosystems: soil and water ecosystem and – description. During course the tri pis planned: visit an organic farm – to obtain information about agroecosystem/ or alternative trip to forest/ on the lake – to obtain information about phenomena occurring in these ecosystems.	
Teaching program: - Ecology, Biology, Environmental protection - basic differences. Chemistry of life - elements and compounds that build a living organism. - Levels of organization of the living world - biosphere, biotic and abiotic factors, organism, species, population, ecosystem, biosphere. - Population - its density and structure, population barriers. - Interactions between organisms - including trophic relations, chemical interactions. - Biocoenosis - diversity and stability of biocenoses, structure and organization. - Ecosystem - productivity of ecosystems, energy flow and circulation of matter, photosynthesis, autotrophs, heterotrophs, reducers. - Trip: visit to farm or alternative trip to forest/ on the lake	
Assessment methods: Written test or presentation of tasks.	
Recommended reading: S. Dash, M. Dash, Fundamentals Of Ecology 3rd Edition. Publisher: Mcgraw Higher Ed. 2009. Odum E., Barrick M., Barrett G.W., Fundamentals of Ecology Paperback (English) 5th Edition. 2005. Guzman Casado G.I., Gonzales de Molina M., Energy in agroecosystems – a tool for assessing sustaiability. 2017.	

Return to list of courses

Course name: **Environmental Chemistry and Analytics**	
Course code: M030	**Form of class:** Lecture, Laboratory, Seminar,
Level of study: postgraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Guziałowska-Tic Joanna, j.guzialowska@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level)	
Objectives of the course and learning outcomes: The aim of this course is to give the students a deeper introduction to the theory and practice of environmental chemistry and analytics.	
Teaching program: Lecture and seminar: • Environmental and chemistry samples preparation (water, wastewater, sludge), • Fundamentals of UV/VIS spectroscopy and IR sp ectroscopy, • Separation techniques, • Examples of application of chromatographic methods in environmental science, • Data analysis (the calibration curves, spectral analysis, quality and quantity analysis). • Atmospheric Chemistry and Air Pollution, • The Greenhouse Effect, Climate Change and CO2, • Water chemistry and Water Pollution, • Toxic Organic Compounds. Laboratory: 1. Environmental and chemical samples preparation (solid phase extraction and Soxhlet extraction). 2. Spectrometric methods in water and wastewater quality control. 3. Measurement of total, organic and inorganic carbon in environmental samples.	
Assessment methods: Laboratory: active participation, laboratory report Lecture: written/test paper examination	
Recommended reading: 1. Manahan, Stanley E. "Frontmatter" Fundamentals of environmental chemistry. Boca Raton. CRC Press, LLC, 2001. 2. Hites R.A., Raff J.D. Elements of environmental chemistry. Wiley 2012. 3. Jorge G. Ibanez, Margarita Hernandez-Esparza, Carmen Doria-Serrano, Arturo Fregoso-Infante, Mono Mohan Singh. Environmental Chemistry. Fundamentals. Springer, 2007. 4. Reeve R.N.: Introduction to environmental analysis, John Wiley	

Return to list of courses

Course name: **Water Technology**	
Course code: M031	**Form of class:** Lecture, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 3	**Number of hours per semester:** 45
Language of instruction: English	
Name of the lecturer and contact information: Kłosok-Bazan Iwona, i.klosok-bazan@po.opole.pl	
Prerequisites: English (min B1 level), ---	
Objectives of the course and learning outcomes: The course presents technologies, installations and equipment for physical, biological and chemical water treatment. This course gives an insight into the different technologies of municipal and industrial water treatment.	
Teaching program: Study of the sources of water and the public health aspects of water supply; chemical, physical and bacteriological standards of water quality; types of water treatment plants; and water treatment procedures, operation, maintenance, storage and distribution. Examines basic fundamentals of laboratory analysis with an emphasis on applied chemical and microbiological procedures for water treatment plant operators. Includes procedures and techniques used in physical, chemical, bacteriological and biological examination of water/wastewater.	
Assessment methods: Written test, oral assesment, , laboratory reports	
Recommended reading: 1.CHEREMISINOFF N., Handbook of Water and Wastewater TreatmentTechnologies; 2.The Nalco Water Handbook - accessible in electronic version in our library 3.BOURKE N., CARTY G., CROWE M., LAMBERT M.: Water Treatments Manuals. Environmental Protection Agency 1995	

Return to list of courses

Course name:
Wastewater treatment Plants Design

Course code: M032	**Form of class:** Lecture, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30

Language of instruction:
English

Name of the lecturer and contact information:
Boguniewicz-Zabłocka Joanna, j.boguniewicz@po.opole.pl

Prerequisites:
English (min B1 level),
English (min B1 level)
Fundamentals of mathematics, chemistry, biology

Objectives of the course and learning outcomes:
This course provides the fundamentals for wastewater treatment processes knowledge , the selection and design of the most appropriate wastewater treatment system. It also provides the basics on technology selection and comparison of different treatment alternatives.
The main objectives of the course are to:
1. Introduce the need for wastewater treatment
2. Investigate the various constituents in wastewater
3. Introduce the changes in quantity and quality of wastewater
4. Expose students to the various chemical and biological treatment techniques employed to treat wastewater
5. Provide an analysis of the characteristics of wastewater treatment processes
After completion of the course students are expected to:
- Acquire the knowledge for the need for water quality and how to achieve it
- Name and categorize the various processes used in wastewater treatment
- Differentiate between the processes of treatment
- Determine the characteristics and the effect of the treatment processes
Project: Describe the main elements and components involved in the project planning and project design, engineering, construction, start-up and operation of a wastewater treatment plant.

Teaching program:
Lecture:
Introduction to wastewater and wastewater network
Domestic wastewater and industrial wastewater control
Physical, chemical and microbiological characterization of water; wastewater and air quality
Sedimentation, flocculation filtration
Biological treatment methods
Reactor tanks
Chemical treatment (softening, absorption and ion exchange)
Conventional unit operations and processes for wastewater
Project:
Technology selection
Hydraulic design
Design and engineering of activated sludge and anaerobic systems
Design and engineering of onsite sanitation systems

Assessment methods:
Midterm oral exams, final test paper exam

Recommended reading:
Forster C. F.: Wastewater treatment and technology. ASCS Press 2003.Wastewater Engineering: Treatment and Reuse. McGraw-Hill's 2002.
James R. Mihelcic , Julie B. Zimmerman, Environmental Engineering: Fundamentals, Sustainability, Design, Wiley 2009
MWH Water Treatment: Principles and Design Wiley 2005
Ronald L. Droste Theory and Practice of Water and Wastewater Treatment Wiley 1996

Return to list of courses

Course name: **Industrial WastewaterTreatment**	
Course code: M033	**Form of class:** Lecture,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Boguniewicz-Zabłocka Joanna, j.boguniewicz@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level) Fundamentals of wastewater treatment, biology.	
Objectives of the course and learning outcomes: The main objectives of the course are to: 1. Introduce the need for industrial wastewater treatment – cleaner production 2. Investigate the wastewater from different industrial sectors 3. Introduce the changes in quantity and quality of wastewater 4. Provide an analysis of the characteristics of industrial wastewater treatment After completion of the course students are expected to: - Acquire the knowledge for the need for wastewater treatment - Name and categorize the various processes used in industrial wastewater treatment - Determine the characteristics and the effect of the treatment processes	
Teaching program: 1. Introduction 2. Permissions required for industril wastewater effluent 3. The types of industrial wastewaters 4. Inorganic industrail wastewaters 5. Organic industrail wastewaters 6. Amounts of industrail wastewaters 7. The effects of industraile wastewater to municipal WWTP and to the environment. 8. Other factors related to the effects of industrail wastewater	
Assessment methods: Midterm oral exams, final test paper exam.	
Recommended reading: Forster C. F.: Wastewater treatment and technology. ASCS Press 2003, Wastewater Engineering: Treatment and Reuse. McGraw-Hill's 2002. Czysz. W, D.A. Schneider, H Rump, Doetsh, S. Thomas, K.Siekmann. and B. Bohnke. 1989. Waste Water Treatment Technology. Origin, Collection,Treatment,and Analysis of Waste Water. Springer- Verlag, Berlin, Germany Tchobanoglous, G., Burton, F.L., and Stensel, H.D. (2003). Wastewater Engineering (Treatment Disposal Reuse) / Metcalf and Eddy, Inc. (4th ed.), McGraw-Hill Book Company.2003	

Return to list of courses

Course name: **Technical Systems of Sanitary**	
Course code: M034	**Form of class:** Lecture, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Pochwała Sławomir, s.pochwala@po.edu.pl	
Prerequisites: English (min B1 level), ---	
Objectives of the course and learning outcomes: The main objective of the course is to provide students with a large knowledge of the design of water supply networks and sewage systems.	
Teaching program: Design of water supply and sewerage: - A specific area on the map with a scale of 1:10,000 to design a network - Calculation of the demand of water for public supply - Calculation of the demand of water for factories - Calculation of maximum demand on the needs of the neighboring village - Draw up a scheme to carry out computational and hydraulic calculations (diameters of pipelines, flow velocity) - Calculation of the maximum hourly cutting projected networks - Calculation of cutting fire - Calculation of the minimum cutting - Applying to plan situational altitude on a scale of 1:10000 scheme projected networks - Execution of the longitudinal profile of the selected section of networks.	
Assessment methods: Graded project.	
Recommended reading: 1.Koike, Takeshi: Critical urban infrastructure handbook, Water Supply System: Design Aspects, 2015. 2.Don D. Ratnayaka, Malcolm J. Brandt and K. Michael Johnson: Water Supply (Sixth Edition), 2009. 3.Dragan Savic, John Banyard: Water Distribution Systems, 2011.	

Return to list of courses

Course name: **Modeling of Water Dystrybution Systems**	
Course code: M035	**Form of class:** Lecture, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 3	**Number of hours per semester:** 45
Language of instruction: English	
Name of the lecturer and contact information: Spyra Andrzej, a.spyra@po.opole.pl	
Prerequisites: English (min B1 level), Working with computer. Knowledge of the basic physical laws of hydrostatics and hydrodynamics	
Objectives of the course and learning outcomes: This course provides an introduction to the hydraulic modelling of water distribution systems. This is followed by an introduction to using EPANET as a calculation tool (EPANET is used as demonstration software although the basic principles taught are applicable to any water distribution modelling software. The course covers the basic theory followed by practical computer sessions strengthening the material covered.	
Teaching program: 1. Lecture: Fluid properties, statics	
Assessment methods: Individual project report, computer-based problem solving work, written test	
Recommended reading: 1.Arnalich S.: Epanet and Development. How to calculate water networks by computer. Water and Habitat, 2011 2.Arnalich S.: Epanet and Development: A progressive 44 exercise workbook. Water and Habitat, 2011 3.Rossman L.: Epanet 2 Users Manual. US Environmental Protection Agency, Cincinnati,USA, 2000	

Return to list of courses

Course name: **Hydrology and Hydraulics**	
Course code: M036	**Form of class:** Lecture, Group tutorial, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 3	**Number of hours per semester:** 45
Language of instruction: English	
Name of the lecturer and contact information: Spyra Andrzej, a.spyra@po.opole.pl	
Prerequisites: English (min B1 level), Advanced knowledge of mathematics	
Objectives of the course and learning outcomes: The primary objective is the demonstration and understanding of the fundamental concepts and processes associated with the hydraulic and water quality design, operation and performance aspects of agriculture and urban drainage systems. Modelling tools will be used to support the design of urban drainage systems (incl. pumping stations, overflows, and other flow regulating structures). The tools will also be used to develop understanding in current pollution problems, and to identify mitigation/rehabilitation measures. In this way, the students will gain a sound understanding of the modelling tools, which can be used to aid decision-making in pollution management, and will get experience in the use of modelling tools through applications within the Integrated Project case studies.	
Teaching program: Lectures/practice: - Introduction - Hydrologic cycle, water balance, precipitation - Evaporation, transpiration, and infiltration - Direct Surface Runoff Stream flow Measurement Hydrographs - Unit hydrographs and design Hydrographs - Flood Frequency Analysis - Flood Routing - Open Channel Flow Principles Uniform Flow and Design of channels - Critical flow and Gradually varied Flow - Roadway Drainage System- Culverts Computer model: CulvertMaster - Urban Hydrology and Urban Drainage Systems - Computation of Storm water - Storm Sewers Design, Detention Pond - Groundwater Flow - Pressure Flows: Pipe System - Pumps and Turbines - Storage and Control Structures Laboratory: - Closed-Conduit Flow: Pipe Systems; Frictional Resistance and Minor Losses; Pipe Networks; Pumps; Water Distribution Networks - Open Channel Flow: Steady Uniform Flow; Flow Through Transitions; Gradually Varied Flow; Rapidly Varied Flow; Discharge Measurements - Engineering Hydrology: Drainage Design; Rainfall-Runoff Predictions; Unit Hydrographs; Design Flood Frequency Estimation	
Assessment methods: 1. 6 quantitative problem sets solved using Excel or similar program, literature review of relevant technical journals. 2. 6 quantitative and qualitative lab reports that build toward the design project and follow recommended writing style and format.	

Recommended reading:
All readings will be scanned into the course. If students are unhappy with the quality of
scans then they are advised to purchase the texts below.
1. Philip B. Bedient, Wayne C. Huber: Hydrology and Floodplain Analysis, Prentice Hall, 2002.
2. Mays L.W. Hydraulic Design Handbook, McGrew-Hill, Inc., New York 1999
3. Potter T.D. Handbook of Weather, Climate and Water- Atmospheric Chemistry, Hydrology and Social Impacts, Wiley-Interscience 2003

Return to list of courses

Course name: **Meteorology and Climatology**	
Course code: M037	**Form of class:** Lecture, Group tutorial,
Level of study: postgraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Olszowski Tomasz, t.olszowski@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level)	
Objectives of the course and learning outcomes: This course aims at developing a sound understanding of the physical processes that influence weather and climate. Students will be able to acquire the basic skills used in meteorology and climatology.	
Teaching program: Introduction; Meteorology and climatology as sciences The Earth System; Atmosphere and its features Basic meteorological elements and their climatological characteristics Atmospheric Thermodynamics, Radiative Transfer; Atmospheric Chemistry Cloud Microphysics, Atmospheric Dynamics; General atmospheric circulation Weather Systems; Atmospheric Boundary Layer Climate Dynamics; Basic climate-forming factors Climate change; Impacts of climate change Paleoclimate; Different sources of meteorological data and information Weather forecast; Climate scenarios	
Assessment methods: Written test paper examination	
Recommended reading: 1. Potter T.D. Handbook of Weather, Climate and Water- Atmospheric Chemistry, Hydrology and Social Impacts, Wiley-Interscience 2003 2.Ahrens C.D. Meteorology Today: An Introduction to Weather, Climate, and the Environment, Cengage Learning, 2008 3. Carbone G. Exercises for Weather	

Return to list of courses

Course name: **Air Pollution Control**	
Course code: M038	**Form of class:** Lecture, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Olszowski Tomasz, t.olszowski@po.opole.pl	
Prerequisites: English (min B1 level), ---	
Objectives of the course and learning outcomes: Assimilation and consolidation of chosen information in scope of atmospheric air menaces, and possibilities of air quality control. Students have to be friendly with fundamentals of air contamination measurements. They will give back raise the level of competence in understanding and identifying the phenomena and processes in the atmosphere, which may adversely affect air quality.	
Teaching program: Basic concepts in the field of air protection and air pollution. Description of the atmosphere, air composition, characteristics of gaseous and particulate pollutants. Characteristics and taxonomy of natural and anthropogenic sources of air pollution. Methods of measurement of gaseous and particulate pollutants in ambient air. Impact of climate variability on the spread of contamination. Dust deposition research. Biomonitoring of ambient air.	
Assessment methods: lecture: oral exam-test, individual consultations laboratory: active participation under the laboratory, written laboratory report	
Recommended reading: 1.Daniel Vallero: Fundamentals of Air Pollution. Daniel Vallero. Elsevier Inc., 2008 (fourth edition). 2.Karl B. Schnelle, Jr., Charles A. Brown: Air Pollution Control Technology Handbook. Taylor and Francis, 2001. 3.Chris Windler: Contaminated Air Protection: Proceedings of the Air. Chris Windler . BALPA. Sydney, Australia, 2005.	

Return to list of courses

Course name: **Pollution Diffusion in Atmosphere**	
Course code: M039	**Form of class:** Lecture, Laboratory,
Level of study: postgraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 3	**Number of hours per semester:** 45
Language of instruction: English	
Name of the lecturer and contact information: Wydrych Jacek, j.wydrych@po.opole.pl	
Prerequisites: English (min B1 level), Elementary knowledge on flow and diffusion in boundary layer of atmosphere.	
Objectives of the course and learning outcomes: Basic knowledge on the main problems of air pollution, air pollution spreading in atmosphere, dry and wet deposition, chemical reactions and possibilities of air pollution modelling.	
Teaching program: - Sources of air-pollution, air-pollution spreading in the earth atmosphere, - Dry and wet deposition, types of anthropogeneous compounds, - Bases of their chemistry, - Space scaling of air-pollution transport, - Lagrangian and Eulerian models, plume models, - Puff models, dispersion modeling, - Practical application of Gaussian models, - Types of meteorological conditions for air-pollution spreading, - Effects of air-pollution on meteorological processes.	
Assessment methods: Formal assessment includes a Mid-Term Test and a Final Test. Both these tests are comprehensive and cover the entire course material up to that date, from lectures, exercises and readings.	
Recommended reading: All readings will be scanned into the course. If students are unhappy with the quality of scans then they are advised to purchase the texts below. a) Lyons T.J., Scott W.D.: Principles of Air Pollution Meteorology, Belhaven Press, London 1990 Heinsohn R.J., Kabel R.L.: Soures and Control of Air Pollution, Prentice Hall Upper Saddle River , New Jersey 1996. b) Potter T.D. Handbook of Weather, Climate and Water- Atmospheric Chemistry, Hydrology and Social Impacts, Wiley-Interscience 2003 c) Ramaswami A. Integrated environmental modeling- Pollutant Transport, Fate and Risk in the Environment, Wiley 2005	

Return to list of courses

Course name: **Advanced metrology in mechanical and environmental engineering**	
Course code: M040	**Form of class:** Lecture, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 3	**Number of hours per semester:** 45
Language of instruction: English	
Name of the lecturer and contact information: Ligus Grzegorz, g.ligus@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level), basic knowledge of fluid mechanics, metrology, theory of machines and mechanical engineering	
Objectives of the course and learning outcomes: Acquire knowledge and skills in the field of experimental aerodynamics. Gain experiences to promote the spirit of team-work among the engineering students.	
Teaching program: 1. Introduction to the aerodynamics and hydrodynamics (review of equipment and measurement techniques) 2. Particle Image Velocimetry (PIV) for aerodynamic and hydrodynamic (applications in selected areas of mechanical and environmental engineering) 3. Introduction to the noise measurement and control (review of equipment and measurement techniques) 4. Introduction to the thermography (review of equipment and measurement techniques) 5. Experimental wind tunnel testing of the selected objects (flow visualization) 6. Noise level measurement in the environment and in the workplace 7. Measurement of temperature of selected objects with the use of IR camera	
Assessment methods: Group laboratory report	
Recommended reading: 1. Adrian R.J, Westerweel J., Particle Image Velocimetry, Cambridge University Press, New York, 2011 2. Biel D. A., Hansen C., H., Engineering noise control: Theory and practice, Spon Press, London, 2009 3. Walker N., Nowicki A.N., Infrared Thermography Handbook - Vol. 1, 2, The British Institute of Non-Destructive Testing, 2004 4. Obidi T.Y, Theory and Applications of Aerodynamics for Ground Vehicles, SEA International, Warrendale, 2014 5. M. Drela, Flight Vehicle Aerodynamics, MIT Press, 2014 6. Instructions provided by the lecturer	

Return to list of courses

Course name: **Environmental Engineering**	
Course code: M041	**Form of class:** Seminar,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Kłosok-Bazan Iwona, i.klosok-bazan@po.opole.pl Król Anna, a.krol@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level), Basic knowledge of waste management, wastewater treatment, air protection. Basic knowledge about different industries and production technologies.	
Objectives of the course and learning outcomes: The course presents technologies, installations and equipment for environmental protection in industry. This course gives an insight into the different technologies and their influence on environment.	
Teaching program: Teaching program for Environmental Engineering course is: characteristics of the production process, localization of industry, describe of technological process, production scheme, overview of the influence of different stages of production on the environment, methods and equipment for environmental protection in industry, methods and equipment for environmental protection in industry during accidents and unexpected events. During course students with teacher work on innovation solutions when choosing equipment for environmental protection in industry.	
Assessment methods: Individual paper report and presentation.	
Recommended reading: 1.Ashby M.F. Materials and the Environment (Second Edition) Elsevier 2013 2.Ekstrom K.M., Waste Management and Sustainable Consumption: Reflections on Consumer Waste, ROUTLEDGE London 2014 3. Tchobanoglous G.,Theisen H.,Vigil S.A, Integrated Solid Waste Management: Engineering Principles and Management Issues, McGraw-Hill Publishing Co.	

Return to list of courses

Course name: **Applications of Geographic Information Systems (GIS)**	
Course code: M042	**Form of class:** Lecture, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Wydrych Jacek, j.wydrych@po.opole.pl	
Prerequisites: English (min B1 level), There are no prerequisites but some background in computer science or geography is helpful.	
Objectives of the course and learning outcomes: By the end of the course, students will be able to: - Identify, locate, and acquire spatial data pertinent to projects in their field of interest, as well as pinpoint significant gaps in or problems with existing information. - Evaluate the appropriateness of the existing data sources for use in a project. - Understand the data creation process and create simple data sets and/or add to existing data - Create spatial data from tabular information that includes a spatial reference - Perform basic spatial analyses (attribute and spatial queries, buffering, overlays) as well as linking these methods together in a more complex analytical model. - Create high-quality maps and associated graphics and text that clearly communicate spatial information and analyses.	
Teaching program: - Introduction - GIS Data and Spatial Models - Topology and Spatial Operations - Projections, Scale and Coordinate Systems - Thematic Mapping - GIS Analysis - Cartography - Network Modeling	
Assessment methods: Three homework assignments, a group project and two individual final projects.	
Recommended reading: All readings will be scanned into the course. If students are unhappy with the quality of scans then they are advised to purchase the text below. a)Longley P.A. GIS teoria i praktyka; eng. Geographic Information Systems and Science, PWN, Warszawa 2008 b)Galati S. Geographic Information Systems Demystified, Artech House Publishers, 2006 c)Goor W. GIS Tutorial 1: Basic Workbook, Esri Press, 2013 d)Allen D. GIS Tutorial 2: Spatial Analysis Workbook, Esri Press, 2013	

Return to list of courses

Course name: **Noise measurement and control**	
Course code: M043	**Form of class:** Lecture, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Ligus Grzegorz, g.ligus@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level), basic knowledge of metrology and theory of machines	
Objectives of the course and learning outcomes: Acquire knowledge and skills in the field of noise measurement and control.	
Teaching program: 1. Measurement of the Sound Pressure Level and Sound Power Level from the industrial sources 2. Workplace noise measurement 3. Road noise measurement 4. Calculation of the Equivalent Sound Level 5. Acoustic testing of industrial silencers	
Assessment methods: Group laboratory reports	
Recommended reading: 1. Biel D. A., Hansen C., H., Engineering noise control: Theory and practice, Spon Press, London, 2009 2. Berger E. H., The noise manual, AIHA, Fairfax, 2003 3. Instructions provided by the lecturer	

Return to list of courses

Course name: **Heating systems and building energy audit**	
Course code: M044	**Form of class:** Lecture, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Ligus Grzegorz, g.ligus@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level), basic knowledge of civil engineering, buildings structures and heating systems	
Objectives of the course and learning outcomes: Acquire knowledge and skills in the field of heating systems design and building heat load calculations	
Teaching program: 1. Principles of 3D building modeling with the use of selected software (creating walls, floors, ceilings, roofs and other building components) 2. Guidelines for computer-aided calculation of heat load with the use of selected software 3. Creating the building energy audit for selected building 4. Principles of design central heating systems with the use of 3D modeling software (importing of buildings model, room zones, selecting and inserting of heat sources, radiators, floor heaters, supply and return pipe networks, valves, pumps, adjusts pre-sets of the pressure and flow rate governors, the requirements regarding the authorities of thermostatic valves) 5. Guidelines for designing a heating system on plan views 6. Creating the project of heating system for selected building. The entire coursework will be done in the software given to students.	
Assessment methods: Individual/group project preparing with the use of a selected software	
Recommended reading: 1. Day A.R., Ratcliffe M.S., Shepherd K.J., Heating Systems, Plant and Control, Blackwell Science, Oxford, 2003 2. McDonald A.G., Magande H., Introduction to Thermo-Fluids Systems Design, Wiley, Chichester, 2012 3. Krigger J., Residential Energy: Cost Savings and Comfort for Existing Buildings, Saturn Resource Management, 2014 4. Pedersen C.O., Cooling and Heating Load Calculation Principles, American Society of Heating, Refrigerating and Air-Conditioning Engineers, 1998 5. User’s manual for software provided by the lecturer	

Return to list of courses

Course name: **Fuels Combustion in Industry**	
Course available with minimum number of 4 participants.	
Course code: M045	**Form of class:** Lecture, Group tutorial, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Wzorek Małgorzata, m.wzorek@po.opole.pl	
Prerequisites: English (min B1 level), Fundamentals of mathematics and thermodynamics	
Objectives of the course and learning outcomes: The aim of this course is to give the students a theoretical and practical knowledge of fuels combustion in industry, additional expose students to general laboratorial techniques of taking measurements of properties of fuels and emissions	
Teaching program: Lecture: Basic information about fuels, clean fossil and alternative fuels; Coal chemistry, conversion and combustion, Technologies for combustion in industry: power plants, incineration plants, cement factories ect.; Exercise: Calculations of high heat value and low heat value of solid, liquid and gases fuels; Calculations of dry and humidity combustion gas contents, emission levels; Complete combustion and incomplete combustion; Energy balance of different boilers; Efficiency of combustion process. Laboratory: Introduction to the course. Samples preparation of different type of fuels; Analysis of physical properties of fuels (content of water, bulk density, particle size distribution, granulation; Measurement of High Heating Value (HHV) of different types of fuels and calculation of LHV; Analysis of ash content and voltaire matter Measurement of pollution emission during combustion 2 types of fuels.	
Assessment methods: Lecture/Exercises: Exam-test Laboratory: Active perception under laboratory, laboratory reports	
Recommended reading: 1.The internal materials prepared by lecturers 2.Miller B.G: Clean Coal Engineering Technology, Butterworth-Heinemann, 2010 3.Williams A. at al.: Combustin and Gasification of Coal, Taylor	

Return to list of courses

Course name: **Alternative Energy Sources**	
Course code: M046	**Form of class:** Lecture, Seminar,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 3	**Number of hours per semester:** 45
Language of instruction: English	
Name of the lecturer and contact information: Anweiler Stanisław, s.anweiler@po.opole.pl	
Prerequisites: English (min B1 level), Knowledge on mechanics, fluid dynamics, heat transfer, environmental aspects of Engineering and modelling	
Objectives of the course and learning outcomes: Energy demand and production, types and distribution of energy sources, alternative and renewable energy sources, renewable energy measurements and calculations, environmental impact and sustainability.	
Teaching program: General rules of environmental engineering in the area of alternative and renewable energy sources. Basic terms, kinds and aims of environmental engineering as an aspect of modern alternative and renewable energy storage, conversion and transmission. Global energy demand and production, types of energy sources, distribution of energy sources, alternative and renewable energy sources exploitation, innovative approach to energy production, renewable energy measurements and calculations. Solar, wind, biomass, water, geothermal, radioactive and other alternative types of energy. Assessing and measuring environmental impact and sustainability. Decarbonisation. Materials applied in eco-building industry. Passive and active renewable energy harvest. Examples of specific renewable energy technologies and its applications.	
Assessment methods: Presentation of prepared scientific paper	
Recommended reading: 1.Lars ROSE (editor): Energy: Modern Energy Storage, Conversion, and Transmission in the 21st Century (Energy Science, Engineering and Technology). Nova Science Publishers, New York, 2013. [ISBN: 978-1619425262] 2.Jiri KLEMES (editor): Assessing and Measuring Environmental Impact and Sustainability. Elsevier, Oxford, 2015 [ISBN: 978-0-12-7999685] 3.Mariano Martin (editor): Alternative energy sources and technologies: Process design and operation. Springer, 2016 4.Myer Kutz: Environmentally Conscious Alternative Energy Production. Wiley, 2008. 5.Felix A. Farret, M. Godoy Simoes: Integration of Alternative Sources of Energy, Wiley 2006.	

Return to list of courses

Course name: **Applied Thermodynamics**	
Course code: M047	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 4	**Number of hours per semester:** 60
Language of instruction: English	
Name of the lecturer and contact information: Tańczuk Mariusz, m.tanczuk@po.opole.pl	
Prerequisites: English (min B1 level), Basics of thermodynamics	
Objectives of the course and learning outcomes: To improve knowledge and understanding of basic rules and laws of thermodynamics. To extend the skills of calculating thermodynamic cycles of chosen thermal machines. To get familiar with case studies of thermal machines that are in operation	
Teaching program: Lecture: First and second law of thermodynamics. Energy balances. Steam cycles. Steam turbine plants. Gas cycles. Gas engines and gas turbines. Combined heat and power plants. Efficiency: internal, net, gross, thermal, mechanical, electrical. Improving efficiency of the cycles and plants: methods with technological details as well as graphical representation in different coordinate systems (specific enthalpy v. specific entropy, temperature v. specific entropy). Exercises: Calculating energy balances of the plants. Working with case study examples. Calculations with Engineering Equestion Solver (EES).	
Assessment methods: Written/test paper examination, practical classes assessment	
Recommended reading: 1.R. M. Helsdon, N. Hiller and G. E. Walker. Introduction to Applied Thermodynamics. A volume in The Commonwealth and International Library: Mechanical Engineering Division. ISBN: 978-0-08-010504-8 2.R.K. Rajpurt. Thermal Engineering. Laxmi Publications, 2005 3.G. Salvendy: Handbook of Industrial Engineering. Technology and Operations Management, Willey and Sons 2001	

Return to list of courses

Course name: **Energy and Environmental Analysis and Prefeasibility Studies**	
Course code: M048	**Form of class:** Lecture, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 4	**Number of hours per semester:** 60
Language of instruction: English	
Name of the lecturer and contact information: Tańczuk Mariusz, m.tanczuk@po.opole.pl	
Prerequisites: English (min B1 level), Basics of thermodynamics, computer skills (MS Excell or similar).	
Objectives of the course and learning outcomes: To get and understand know-how on technical and economic analysis of energy projects. To be able to make feasibility studies of real cases applications.	
Teaching program: Basics of economical calculations. Introducing into costs and benefits analysis. Discounted method. Cash flows. Net Present Value. Simple and Discounted Payback Time. Internal Rate of Return. Building MS Excell worksheets for calculations of economic efficiency of the projects for different energy modelling cases, including industrial and domestic project of energy generation and supply. Implementation of sensitivity analysis modules into the calculation. Presentation of the results with use of active charts. Proper conclusion formulation and discussion of the results.	
Assessment methods: Oral examination and practical classes assessment.	
Recommended reading: 1.Shannon P. Pratt, Robert F. Reilly, Robert P. Schweihs. Valuing a Business: The Analysis and Appraisal of Closely Held Companies. McGraw-Hill Education, 2000. 2.Munsaka, Temba. The Importance of Project Feasibility Study. 2016. ISBN 10: 3656535337. 3.D. Elliott: Sustainable Energy: Opportunities and Limitations. 2007. ISBN 978-0-230-24174-9	

Return to list of courses

Course name: **Modeling of Energy Systems**	
Course code: M049	**Form of class:** Lecture, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 4	**Number of hours per semester:** 60
Language of instruction: English	
Name of the lecturer and contact information: Tańczuk Mariusz, m.tanczuk@po.opole.pl	
Prerequisites: English (min B1 level), Basics of thermodynamics, Energy conversion	
Objectives of the course and learning outcomes: To get the skills for modeling selected energy conversion system with use of a dedicated software. To get familiar with case studies of thermal machines regarding thermodynamic analysis	
Teaching program: Steam-water thermal cycles. Gas thermal plants. Heat generating facility versus cogeneration of heat and power (CHP units). Modelling of conventional plants integrated with removable energy systems. Steam power plants and heat generating and power plants. Methodology of modeling of energy conversion plants based on thermal cycles. Engineering equation solver - introduction and calculation examples. Implementation of techno-economic analysis modules into thermodynamic modelling. Optimization methods. Modelling of operation type of CHP units: heat tracking operation, electricity tracking operation, fuel tracking operation and mixed ones.	
Assessment methods: Written/test paper examination, practical classes assessment.	
Recommended reading: 1. Renaud Gicquel. Energy Systems: A New Approach to Engineering Thermodynamics. January 27, 2012 by CRC Press. 2. Introduction to Energy Systems Modelling Andrea Herbst, Felipe Toro, Felix Reitze, and Eberhard Jochem. Swiss Journal of Economics and Statistics, 2012, Vol. 148 (2) 3. Klemeš, Jirí Jaromír / Varbanov, Petar Sabev / Wan Alwi, Sharifah Rafidah Wan / Manan, Zainuddin Abdul. Process Integration and Intensification. Saving Energy, Water and Resources. May 2014, ISBN 978-3-11-030685-9.	

Return to list of courses

Course name: **Technologies and industrial apparatus**	
Course code: M050	**Form of class:** Lecture, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 3	**Number of hours per semester:** 45
Language of instruction: English	
Name of the lecturer and contact information: Płaczek Małgorzata, m.placzek@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level)	
Objectives of the course and learning outcomes: The aim of the course is to present basic issues related to industrial technology, preparation, stored and transportation of materials and design of machines used in these processes. The goal of this course is to give the students insight into the methodology that is used in process plant design and indicate on the important elements of design work	
Teaching program: Lecture: 1. Introduction to the subject. Storage of liquids, gases and solids. Pressure and non-pressure storage tanks. 2. Bulk material handling systems. 3. Fluidization, pneumatic and hydraulic transport. 4. Mixers- process characteristics and application. 5. Dryers- characteristics and application. Project: Design of the system for transportation of different materials or mechanical separation of transported multiphase systems	
Assessment methods: Lecture: Test paper examination. Project: individual project paper report including process calculations and engineering drawing of designed installation	
Recommended reading: 1. Materials prepared by lecturer 2. McCabe W.L., Smith J.C.: Unit Operations of Chemical Engineering 7 ed. McGraw-Hill Education, 2005 3. Don W. Green, Robert H. Perry: Perry's chemical engineer's handbook, 8 ed. McGraw Hill Professional, 2007	

Return to list of courses

Course name:
Heat Transfer

Course code: M051	**Form of class:** Lecture, Group tutorial, Seminar,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 3	**Number of hours per semester:** 45

Language of instruction:
English

Name of the lecturer and contact information:
Filipczak Gabriel, g.filipczak@po.opole.pl
Płaczek Małgorzata, m.placzek@po.opole.pl

Prerequisites:
English (min B1 level),
English (min B1 level),
Fundamentals of mathematics
Fluid Mechanics

Objectives of the course and learning outcomes:
The objective of this course is to introduce (through a combination of theory, exercises and seminar programme) to the fundamental rules of heat transfer processes. By this course it is examines three main heat transfer mechanisms: conduction, convection and radiation. The problems of heat transfer by conduction through one- and multilayer flat and cylindrical walls and free and forced convection description will be discussed as well as the relations for radiative heat transfer will be analyzed. The main purpose of subject is acquire knowledge about fundamentals of heat transfer mechanisms, including principles and calculations of heat transfer processes constituting background for design of heat exchangers and other thermal equipment (heating systems). A discussion about theory of chosen mechanisms of heat transfer will be followed based on lecture discussion, homework exercises and seminary programme.

Teaching program:
Topics to be covered:
1. Fundamentals of heat transfer process including the basic requirements for heat transfer - driving force of heat transfer, rate of heat transfer and heat flux, thermal properties of different substances and insulation materials, thermal resistance etc.
2. Fundamental characteristic of steady state heat transfer mechanisms: conduction through flat and cylindrical walls, convection and radiation.
3. Free and forced convection as well as the overall coefficient (thermal resistance) of heat transfer.
4. Basic concepts of radiation. The laws of radiation - Stefan-Boltzmann law. Configuration factors, heat transfer between two surfaces and heat screens. Gas radiation.
5. Heat losses and insulation (heat losses from flat and cylindrical surfaces - with and without of insulation). Insulation materials – types and thermal functions.
6. Design of heat exchangers - LMTD and NTU method.
7. Selected ways to intensify of heat transfer by reducing of thermal resistances.
8. Particular cases of heat transfer - heating and cooling, boiling and condensation.
9. The general applications of heat transfer process – chemical and power plants, nuclear reactors, fluidized beds, food processing, manufacturing and processing industries, etc.

Assessment methods:
Lecture: participation and test paper examination (credit course).
Exercises: active participation under the exercises, homework exercises, individual consultations
Seminar: active participation under the seminar, essay (a few pages) and oral presentation of set topic, individual consultations.

Recommended reading:
1. Materials prepared by lecturers – Lecture Handbooks.
2. Bayazitolu Y., Özisik M. N.: Elements of heat transfer, McGraw-Hill, New York, 1988.
3. Frank P.: Fundamentals of Heat and Mass Transfer, Incropera [et all]. - 6th ed. - John Wiley
4. Wzorek M. (Ed.): Handbook of process engineering calculations, Opole University of Technology, 2019

Return to list of courses

Course name: **Heat and Mass Transfer Operations**	
Course code: M052	**Form of class:** Lecture, Group tutorial, Seminar,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 3	**Number of hours per semester:** 45
Language of instruction: English	
Name of the lecturer and contact information: Filipczak Gabriel, g.filipczak@po.opole.pl Płaczek Małgorzata, m.placzek@po.opole.pl	
Prerequisites: English (min B1 level), Fundamentals of thermodynamics and heat transfer mechanisms.	
Objectives of the course and learning outcomes: The aim of this lecture is to provide students with basic knowledge from the area of heat and mass transfer processes taking place in process engineering equipment. The course examines the three fundamental heat transfer mechanisms - conduction, free and forced convection and radiation. Solutions are obtained for flat and tubular walls, including heat transfer losses and insulation use. In mass transfer area student learns the issues of construction and operation of the apparatus for distillation and rectification processes.	
Teaching program: a) heat transfer: - fundamentals of heat transfer processes, - introduction to conduction (one- and two-dimensional, steady state conduction), - free and forced convection, - radiation (processes and properties, exchange between surfaces), - construction and work of heat exchangers, - examples of heat transfer processes studied in the laboratory include (convective heat transfer) - principal methods of heat transfer intensification, - insulation (type, material, functions); b) mass transfer: - theoretical basis for mass transfer, - analogy between mass and heat transfer, - characteristic of packed bed and plate columns and their internal equipment.	
Assessment methods: Course work/oral presentation/written test examination.	
Recommended reading: 1. Płaczek M., Filipczak G.: The internal faculty materials prepared by lecturers, 2. Boyazitoglu Y., Ozisik M.: Elements of heat transfer, McGraw-Hill, New York, 1988 3. Frank P. [at all]: Fundamentals of Heat and Mass Transfer, John Wiley	

Return to list of courses

Course name: **Processes and Technology of Production**	
Course code: M053	**Form of class:** Lecture, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Filipczak Gabriel, g.filipczak@po.opole.pl Płaczek Małgorzata, m.placzek@po.opole.pl Wzorek Małgorzata, m.wzorek@po.opole.pl	
Prerequisites: English (min B1 level), ---	
Objectives of the course and learning outcomes: The aim of this course is to give the students a practical knowledge on basic unit operations which are used in different technologies in industry.	
Teaching program: General view of unit operations in industry, Practical application of production technology (Introduction); Selected unit operations in separation processes: gravity settling process and filtration, basic equipment for liquid-solid sedimentation, filtration and application of membrane; Mixing in liquid phase and application of mixing processes; Drying process and main equipment for drying; Basic information about distillation, absorption and adsorption processes; Material distribution for level replacement, relations demonstrate, formula of preparation to development, method and techniques in process operations: crashing, sorting, transport.	
Assessment methods: Test, presentations, laboratory reports	
Recommended reading: 1.The internal materials prepared by lecturers 2.McCabe W.L., Smith J.C.: Unit Operations of Chemical Engineering, McGraw-Hill Chemical Engineering Series, 1976 3.Reynolds T.D., and Richards P.: Unit Operations and Processes in Environmental Engineering, PWS Publishing Company 1996	

Return to list of courses

Course name: **Process Engineering**	
Course code: M054	**Form of class:** Lecture, Group tutorial, Seminar,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Filipczak Gabriel, g.filipczak@po.opole.pl Płaczek Małgorzata, m.placzek@po.opole.pl	
Prerequisites: English (min B1 level), Fundamentals of mathematics and fluid dynamics.	
Objectives of the course and learning outcomes: The aim of this course is to give the students a deeper introduction to the theory of Process Engineering, to acquire advanced process engineering knowledge and prepare of students to general laboratorial techniques related to mechanical unit operations especially occurring in multiphase systems, as sedimentation, mixing of suspensions, filtration as well as any aspects of multiphase flow connected with other unit operations according to lecture program.	
Teaching program: General view of unit operations in process and chemical engineering – mechanical, heat and mass transfer operations (Introduction); Physical properties and units, total-energy equation of steady flow process, fluid flow phenomena (laminar and turbulent flows of Newtonian fluids, pressure drop); Multiphase flow of two-phase systems - flow patterns and pressure drop, applications to industry process and equipment, Selected unit operations in separation processes: gravity settling process and filtration, basic equipment for liquid-solid sedimentation and filtration; Mixing in liquid phase and application of mixing processes; Elements of heat transfer – heat transfer by conduction in solids, principles of heat flow in fluids, heat exchanger equipment.	
Assessment methods: Coursework/individual presentation/written test examination.	
Recommended reading: 1.Płaczek M., Filipczak G.: The internal materials prepared by lecturers 2.McCabe W.L., Smith J.C.: Unit Operations of Chemical Engineering, McGraw-Hill Chemical Engineering Series, 1976 3.Reynolds T.D., and Richards P.: Unit Operations and Processes in Environmental Engineering, PWS Publishing Company 1996 4.Hetsroni G.: Handbook of Multiphase Systems, New York, McGraw-Hill Book Co., 1986.	

Return to list of courses

Course name: **Selected Elements of Process Engineering**	
Course code: M055	**Form of class:** Lecture, Seminar,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 3	**Number of hours per semester:** 45
Language of instruction: English	
Name of the lecturer and contact information: Filipczak Gabriel, g.filipczak@po.opole.pl Płaczek Małgorzata, m.placzek@po.opole.pl	
Prerequisites: English (min B1 level), Fundamentals of mechanical or environmental and process engineering.	
Objectives of the course and learning outcomes: The aim of this lecture is to provide students with basic knowledge from the area of mechanical and heat transfer processes taking place in multiphase systems. The student learns the processes, their mechanism, and also becomes prepared for self-solving engineering tasks.	
Teaching program: Two-phase flow: nature and general application of multiphase flow processes, two-phase gas-liquid and liquid-liquid flow (flow patterns and pressure drop), three phase liquid-liquid-gas flow (flow patterns and pressure drop), multiphase fluids flow - transport in pipes; Two-phase heat processes: pool boiling and convective heat transfer - heat transfer mechanism, flow boiling and evaporation, heat transfer coefficient – the basic method for calculation, project and design exercises; Modelling of multiphase heat transfer processes: basic equations of two-phase flow, the homogenous and separated models, Practice and applications: heat boilers, evaporators.	
Assessment methods: Coursework/individual presentation/written test examination.	
Recommended reading: 1.Płaczek M., Filipczak G.: The internal materials prepared by lecturers 2.McCabe W.L., Smith J.C.: Unit Operations of Chemical Engineering, McGraw-Hill Chemical Engineering Series, 1976 3.Reynolds T.D., and Richards P.: Unit Operations and Processes in Environmental Engineering, PWS Publishing Company 1996 4.Hetsroni G.: Handbook of Multiphase Systems, New York, McGraw-Hill Book Co., 1986.	

Return to list of courses

Course name: **Mechanical Operations**	
Course code: M056	**Form of class:** Lecture, Group tutorial, Seminar,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Filipczak Gabriel, g.filipczak@po.opole.pl Płaczek Małgorzata, m.placzek@po.opole.pl	
Prerequisites: English (min B1 level), Fundamentals of mathematics.	
Objectives of the course and learning outcomes: The aim of this course is to give the students a deeper introduction to the theory of mechanical operations such as sedimentation, mixing, filtration. The primary objective of this course is to identify the important physical mechanisms occurring in processes involving particles, discuss unit operation and its role in chemical industries, characteristics of particulate solids, principles of size reduction, particle dynamics and separation of particles, formulate and solve mathematical descriptions of such processes.	
Teaching program: Topics to be covered: 1. Characteristic of physical properities of solid particles, suspension. 2. The phenomenon of sedimentation- introduction. Clarification and centrifugal sedimentation. 3. Characteristic of filtration process: definition, mechanism of filtration, driving force of the process, constant-rate and constant-pressure filtration, application area of filtration processes, hot, cold and vacuum filtration, characteristic of filter media (material: woven material, perforated sheet metal, bed of granular solid built up on supporting medium, membrane filter media; surface and depth filter), filter aids, pressure drop across the filter medium, classification of filtration equipments, operation of filtration (continuous and discontinuous). Characteristic and operation parameters of selected filtration apparatuses: plate and frame filter press, rotary drum filter, pressure and sand filter, disc filter, centrifugal filtration. 4. Introduction to mixing process (theorethical background). Mixing in different systems (liquid-liquid, liquid-solid, gas-liquid-solid). Mixing induced by gas phase, liquid phase and mechanical agitators. Mixing mechanisms. Mixers design and operation parameters. Flow pattern during mixing (tangential, radial, axial flow). Characteristic of impellers. Creating a vortex and role of baffles. Role of mixing process in chemical, biochemical, food, pharmaceutical industries.	
Assessment methods: Lecture: test paper examination Exercise: active participation under the exercise, individual consultations, resolved task lists Seminar: active participation under the seminar, essay (10 pages) or oral presentation of set task, individual consultations.	
Recommended reading: 1.Materials prepared by lecturer. 2.McCabe W.L., Smith J.C and Harriott P., “Unit Operations of Chemical Engineering”, 7th Ed., McGraw Hill, 2005. 3.Doran Pauline M.: Bioprocess engineering principles, 2nd ed. – Amsterdam, Elsevier, 2013, 919 s. 4.Najafpour Ghasem D.: Biochemical engineering and biotechnology, 2nd ed., Amsterdam, Elsevier, cop. 2015.	

Return to list of courses

Course name: **Bioprocess Engineering**	
Course code: M057	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Płaczek Małgorzata, m.placzek@po.opole.pl	
Prerequisites: English (min B1 level), Fundamentals of mathematics, chemistry, biology.	
Objectives of the course and learning outcomes: The aim of this course is to provide the information about bioprocess engineering and indication of its important role for development of biotechnology industry. Moreover, the aim of this course is to provide the information about technical aspect of microorganisms cultivation especially those that are used industrially. Description of performance of typical biotechnology processes realized in a large scale, as well as design and ability to use of different bioreactor type. The course is designed to be a study of all aspects of practical application of microorganisms. Some part of the course is dealing with production of different substances in a biotechnological way (alcohols, organic acid, antibiotics, vitamins or cultivation of plant and tissue cells in bioreactors). Additionally, some information about environmental protection (wastewater treatment and bioremediation) will be also provided.	
Teaching program: 1. Introduction to bioprocess engineering (steps in bioprocess engineering development). 2. Comparison of chemical and biochemical ways of production. 3. Bioreactor design (type of bioreactor: stirred tank reactor, bubble column, airlift bioreactors, immobilized system, loop bioreactor; scale up of bioprocess, etc.). 4. Modes of operation of bioreactors (batch, fed batch, continuous). 5. Technical aspect of bioprocess realization (mixing, aeration, cooling, sterilization). 6. Kinetics of biomass growth (growth phases of cells, growth kinetics for batch, fed batch and continuous culture, biomass growth models). 7. Stoichiometry of cell growth and product formation (elemental balances, electron balances, biomass and product yields, theoretical oxygen demand). 8. Heat and mass transfer processes in bioreactor. 9. Enzyme technology (specific function, classification, enzymes act as catalysts, industrial application of enzymes, enzyme deactivation). 10. Upstream processing (screening of microorganism, preparation of culture media, inoculation) and downstream processing (solid-liquid separation processes, method of cell disruption and release of intracellular products, concentration, purification, drying and methods of final product formulation). 11. Application of fermentation processes (technology production of selected bioproducts). 12. Bioprocess engineering and environmental protection.	
Assessment methods: Lecture: test paper examination, Exercise: active participation under the exercise, individual consultations, resolved task lists or test paper examination.	
Recommended reading: 1.Materials prepared by lecturer. 2.Doran M.P.: Bioprocess Engineering Principles, Academic Press Limited, UK 2013. 3.Najafpour G.D.: Biochemical Engineering and Biotechnology, 2nd edition, Elsevier 2015. 4.Basic Biotechnology, Ratledge C., Kristiansen B., Cambridge University Press, 2006.	

Return to list of courses

Course name: **Engineering of Reactors**	
Course code: M058	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Płaczek Małgorzata, m.placzek@po.opole.pl	
Prerequisites: English (min B1 level), Fundamentals of mathematics, chemistry.	
Objectives of the course and learning outcomes: The aim of this course is to give the information about the fundamentals of reaction equilibrium and kinetics. Characteristic of types and operational work conditions of different reactors used in chemical industry. Description of heat and mass transport processes in chemical reactors.	
Teaching program: 1.Introduction to engineering of chemical reactors. Evolution of the chemical process industries. Importance of multiphase reactors. 2.Fundamentals of reaction equilibrium and kinetics. Classification of chemical reactions. Multiple reactions (parallel and series reactions). 3.Types and fundamental properties of chemical reactors (Continuous Stirred-Tank Reactor (CSTR), Batch Reactor, Tubular Plug-Flow Reactor). 4.Mass balance for different types of chemical reactors. 5.Heat transfer in reactors. Energetic balance of ideal reactors. 6.Stationary and non-stationary state of chemical reactor. 7.Models of heterogeneous catalytic reactors. 8.Details of design and scale up aspects of several important types of multiphase reactors. 9.Optimization of chemical processes.	
Assessment methods: Test paper examination.	
Recommended reading: 1.Materials prepared by lecturer. 2.Schmidt, Lanny D., The Engineering of Chemical Reactions, New York, Oxford University Press, 1998. 3.Nauman, E. Bruce: Chemical Reactor Design, Optimization, and Scaleup, McGraw-Hill, 2002. 4.Pangarkar V.G.: Design of multiphase reactors, John Wiley	

Return to list of courses

Course name: **Design Work - Installation for Solution Production**	
Course code: M059	**Form of class:** Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Płaczek Małgorzata, m.placzek@po.opole.pl	
Prerequisites: English (min B1 level), Fundamentals of mathematics and process engineering.	
Objectives of the course and learning outcomes: The goal of this course is to give the students insight into the methodology that is used in process plant design and indicate on the important elements of design work. The aim of this course is to expose students to general engineering design work of special types of industrial installation related to calculation of fluid flows, mixing, selection of different elements of apparatuses equipment (piping and instrumentation) and finally preparation of engineering drawing of designed installation.	
Teaching program: Topics to be covered: 1.Determination of the medium properties (dynamic viscosity, density of particular liquids and mixture). 2.Storage tanks geometry and material determination. 3.Calculation of orifice size in bottom of the storage tank; determination of the pipeline diameter. 4.Selection of mixer type (geometry and material, type of stirre, calculation of power demand for mixing). 5.Selection of equipment to the installation (flange to pipes, valves, bends,tees, bottoms to the tank, support for tanks and mixer). 6.Calculation of frictional, local, hydrostatic and finally total pressure drop, power and selection of proper pump. 7.Preparation of engineering drawing of designed installation.	
Assessment methods: Project: active participation under the project, individual consultations, written report including process calculation and engineering drawing of designed installation.	
Recommended reading: 1.Materials and tables prepared by lecturer. 2.McCabe W.L., Smith J.C.: Unit Operations of Chemical Engineering, 7 ed. McGraw-Hill Education, 2005. - 1140 s.	

Return to list of courses

Course name: **Design Work - Installation for gas cooling and humidification**	
Course code: M060	**Form of class:** Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Płaczek Małgorzata, m.placzek@po.opole.pl	
Prerequisites: English (min B1 level), Fundamentals of mathematics and process engineering.	
Objectives of the course and learning outcomes: The goal of this course is to give the students information about methodology used in process plant design and indicate on the main elements of engineering design work . The aim of this course is to expose students to general engineering design work of special kinds of installation. The project include: determination of fluid properties, fluid flows, calculation of heat transfer, geometry of heat exchanger and packed tower, pressure drop, selection of different elements of apparatuses equipment (piping and instrumentation) and finally preparation of engineering drawing of designed installation.	
Teaching program: Topics to be covered: 1. Determination of the medium properties (dynamic viscosity, density, specific heat). 2. Liquid storage tanks geometry and material determination. 3. Calculation of scrubber (diameter and high of scrubber, check on holdup, maximum gas velocity). 4. Selection of scrubber device (selection of type of liquid collector and redistributor, bed limiter, droplet separator, etc.). 5. Calculation of heat exchanger (heat transfer area, selection of heat exchanger type). 6. Selection of equipment to the installation (flange to pipes, valves, bends,tees, heads, support for particular apparatuses). 7. Calculation of frictional, local, hydrostatic and finally total pressure drop, power and selection of pump. 8. Preparation of engineering drawing of designed installation.	
Assessment methods: Project: active participation under the project, individual consultations, written report including process calculation and engineering drawing of designed installation.	
Recommended reading: 1.Materials and tables prepared by lecturer. 2.McCabe W.L., Smith J.C.: Unit Operations of Chemical Engineering, 7 ed. McGraw-Hill Education, 2005. 3.Bayazitolu Y., Özisik M. N.: Elements of heat transfer, McGraw-Hill, New York, 1988. 4.Frank P.: Fundamentals of Heat and Mass Transfer, 6th ed., Hoboken, NJ, John Wiley	

Return to list of courses

Course name: **Process Flow Systems**	
Course code: M061	**Form of class:** Lecture, Group tutorial, Seminar,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Filipczak Gabriel, g.filipczak@po.opole.pl Płaczek Małgorzata, m.placzek@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level), Fundamentals of fluid mechanics, Process engineering.	
Objectives of the course and learning outcomes: The aim of this course is to give the students information about process flow systems including characteristic of fluids, calculation of pressure drop in pipeline, types of pumps description, procedure of pump selection for installation.	
Teaching program: Topics to be covered: 1. Definitions and fundamentals of fluids rheology. (Newtonian and non-Newtonian fluids, thixotropic behaviors). Characteristic and examples. The viscosity of newton and non-newton fluids. Types of boundary layer. 2. The pressure drop. Calculation of pressure drop in pipeline (frictional, local and hydrostatic pressure). Loss coefficients for pipeline components. 3. Common pump types. System characteristics and pump total head. Pump’s selection criteria (best efficiency point). Pumping systems (pumps in parallel and serial connection). 4. Cavitation phenomena.	
Assessment methods: Lecture: test paper examination Exercise: active participation under the exercise, individual consultations, resolved task lists Seminar: active participation under the seminar, essay (10 pages) or oral presentation of set task, individual consultations.	
Recommended reading: 1.Materials prepared by lecturer. 2.White F.M.: Fluid Mechanics, McGraw-Hill, 1999. 3.Kolev N.I.: Multiphase Flow Dynamics Vol. 1, 2, Berlin, Springer-Verlag, 2015.	

Return to list of courses

Course name: **Sustainable Development for Engineers**	
Course code: M062	**Form of class:** Lecture, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Kłosok-Bazan Iwona, i.klosok-bazan@po.opole.pl	
Prerequisites: English (min B1 level), ---	
Objectives of the course and learning outcomes: Basic terms connected with Sustainable Development rules implementation.	
Teaching program: Why sustainability is so important. Sustainable Development in practice. Sustainability indicators. Measuring sustainability. Environmental hazards and squandering resources. Environmental Impact Assesment. Integrated Product Policy (LCA) - part I. Integrated Product Policy (LCA) - part II. Sustainable development in the company. Economic aspects of Sustainable Development. Sustainable Development and innovation process. Environmental aspects of innovation and new technology transfer.	
Assessment methods: Reports.	
Recommended reading: 1.De Las Heras A., (2014) Sustainability Science and Technology: An Introduction CRC Press, 2.Allenby B.R. (2012) The Theory and Practice of Sustainable Engineering Pearson (Prentice Hall) 3.Azapagic A., Perdan S. (2011) Sustainable Development in Practice: Case Studies for Engineers and Scientists 2nd Edition Wiley.	

Return to list of courses

Course name:
Spatial Planning and Urban Design

Course code: M063	**Form of class:** Lecture,
Level of study: postgraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 1	**Number of hours per semester:** 15

Language of instruction:
English

Name of the lecturer and contact information:
Wydrych Jacek, j.wydrych@po.opole.pl

Prerequisites:
English (min B1 level),

Objectives of the course and learning outcomes:
The subject extends knowledge from fields of study of land-use planning and urbanismus and is optional in terms of academic specialization in regional economy and public administration. The purpose of the course is to develop a deeper understanding of the processes and actors which determine urban and regional development, and how these affect planning practice. After completing the course, the student shall be able to evaluate and critically analyse planning practice in Poland, Europe and elsewhere.

Teaching program:
- Spatial conjunctions of society development (space and time like essential entities and progress parameters of human society; historical development, current situation and evolutional tendency in global, national and regional criteria, especially in central Europe, spatial consequences of globalization)
- Settlement of Poland (structure of residential system, mutual relations of seats; town-planning and building structure of seats, use of territory; international confrontation, especially with neighbouring states; settlement changes in conditions)
- Settlement system and towns theory (urbanization, suburbanization, des-urbanization, re-urbanization)
- Typology of town agglomerations and towns in Europe and in Poland (factor affecting settlement and town development; tools for purposeful interaction development of municipal system and towns; resident axis and centre seats, "network of towns"; relation between towns and its background)
- Function of towns, functional, town-planning and building structure of towns (town like grown organism; urban analysis of towns; zoning and draft "towns of short routes"; town-planning structure of contemporary big towns in Poland and parameters of their parts, morphology of towns)
- Characteristic of the main functional components of towns and their mutual connections (a town like place of residence and workplace, resting-place and recreation, centre of administration, culture and education and their operational and town-planning connections)
- Characterization of "technical" components of towns" (technical infrastructure, traffic roads and arrangements, telecommunication)
- Rural space and rural seats and landscape (typology of rural space and rural seats and their functional, town-planning and building characteristics, structure of land and changes in its arrangements and use)
- Land-use planning like instrument of regulation development, arranging seats and land and relation to other territorial relevant kinds of planning (relation to territorial planning and developing programs on level of regions and municipalities; territorial connections developing plan corporations and institutions; land-use planning and landed modifications; land-use planning and branch planning - in sector of agriculture and wood economy, transport and technical infrastructure, living and civic equipments and services)
- Systematics spatially relevant planning in European union - divergences of spatial planning in Germany and France and land-use planning in Poland, territorial basic informations for cross-border cooperation; information system and land-use planning).

Assessment methods:
Formal assessment includes a Mid-Term Test and a Final Test. Both these tests are comprehensive and cover the entire course material up to that date, from lectures and readings.

Recommended reading:
All readings will be scanned into the course. If students are unhappy with the quality of scans then they are advised to purchase the texts below.
1.Gindroz R. The Urban Design Handbook: Techniques and Working Methods, Norton

Return to list of courses

Course name: **Basics of Business Entities of Economy**	
Course code: M064	**Form of class:** Lecture,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Kuczuk Anna, a.kuczuk@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level), fundamentals of mathematics.	
Objectives of the course and learning outcomes: The aim of the course is to acquire basic knowledge in the field of microeconomics and selected topics of macroeconomics.	
Teaching program: - Fundamentals of economics notions - rarity phenomena, problem of management, goods and services, resources, decisions making. - Market, price, demand, supply - market structure, market mechanism, market balance. - Consumer's decisions - rules of consumer decisions, usability theory. - Producer's decisions - production' function, costs. - Market structures - market of perfect competition, full monopoly, non-perfect competition; - Labour market, land market; - Aggregated supply and demand, macroeconomics balance; - Unemployment, kinds of unemployment. Inflation - kinds, reasons, measures	
Assessment methods: Written test or presentation of tasks.	
Recommended reading: Begg D., Dornbush R., Fisher S., Economics, subsequent editions; Curtis D., Irvine I., Microeconomics: Markets, Methods and Models, Lyryx 2014; Blachard O. Stanley F., Lectures on macroeconomics, MIT Press, 1989	

Return to list of courses

Course name: **Organization of Agricultural Production**	
Course code: M065	**Form of class:** Lecture, Seminar,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Kuczuk Anna, a.kuczuk@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level), basic knowledge on plant and animal production	
Objectives of the course and learning outcomes: The aim of the course is to acquire basic knowledge in the field of organization production in agriculture including environmental protection in agricultural production	
Teaching program: Fundamental notions used in organization production in agriculture. Characterization of production factors and farming resources. Farm territory, farm shape, fields shape. Land and soil - counting of agricultural lands structure and structure of total area, measure of soil quality. Fundamentals of organization notions in plant production - meaning and specificity of crop production, structure of sowing, harvest and yields, crop-rotation, fertilization. Counting and analysis of sowing structure, share of plants making the soil more fertile, counting of intensity of crop production, study of crop-rotation, balance of soil organic matter, index of green fields. Fundamentals of organization production in animal production, rotation of a herd, preliminary and balance of manure, preliminary and balance of fodder, intensity of animal production. Organization of work in a farm.	
Assessment methods: Written test or presentation of tasks.	
Recommended reading: Debertin D.L., Agricultural Production Economics: The Art of Production Theory. CreateSpace Independent PublishingPlatform, 2012. Olson Kent. D., Farm Management: Principles and Strategies 1st Edition, 2004. Starnge M. Family Farming: A New Economic Vision, New Edition. 2008	

Return to list of courses

Course name: **Biological Wastewater Treatment: Principles, Modelling and Design**	
Course code: M066	**Form of class:** Lecture, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English (and/or Ital	
Name of the lecturer and contact information: Boguniewicz-Zabłocka Joanna, j.boguniewicz@po.opole.pl	
Prerequisites: English (min B1 level), Basic knowladge about water and wastewater treatment	
Objectives of the course and learning outcomes: Develop understanding of biological treatment methods. Understand concepts that are essential to understanding biological processes in engineered reactors.	
Teaching program: Introduction to biological wastewater treatment Classification and fundamentals of biochemical operations Configuration of activated sludge tank used in biological treatment Basic characteristic of anoxic, anaerobic and aerobic condition Stoichiometry	
Assessment methods: written test, coursework	
Recommended reading: Grady, C.P.L., Daigger, G.T., and Lim, H. (1998) Biological Wastewater Treatment, 2nd Ed. Marcel Dekker, New York, 1096 pp., ISBN 0-8247-8919-9	

Return to list of courses

Course name: **Kinesiotaping**	
Course code: F03	**Form of class:** Seminar,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Rutkowski Sebastian, s.rutkowski@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level), at least two course participants	
Objectives of the course and learning outcomes: Upon completion of this course, Including the lecture, demonstration and practical, the student will be able to: Explain and apply the concepts of the Kinesio Taping Method. Describe the unique qualities of the tape Understand the principles of tape application. Apply a time-efficient method to decrease muscle spasm, pain and swelling. Apply various taping techniques for treatment of the spine and upper / lower extremity dysfunction	
Teaching program: Students are acquainted fundamental concepts of the Kinesiotaping method and the unique properties and use of Kinesio tape to practice muscle applications for the upper and lower limbs, trunk, back and neck. Students will be able to apply the Kinesiotaping method to relax overuse syndromes, stimulate weak muscles and decrease pain and swelling. Describe the various cutting techniques and their clinical applications. Corrective Taping Techniques: Mechanical Correction Fascia Correction Space Correction Ligament/Tendon Correction Functional Correction Lymphatic Correction	
Assessment methods: practical classes assessment	
Recommended reading: Lecture notes Kenzo Kase, Jim Wallis, Tsuyoshi Kase. Clinical Therapeutic Applications of The Kinesio Taping Method Book John Gibbons. A practical guide to Kinesiology Taping John Langendoen. Kinesiology Taping The Essential Step-By-Step Guide	

Return to list of courses

Course name: **Practical Training**	
Course code: F06	**Form of class:** Group tutorial,
Level of study: postgraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 5	**Number of hours per semester:** 75
Language of instruction: English	
Name of the lecturer and contact information: Łuniewski Jacek, j.luniewski@po.opole.pl	
Prerequisites: English (min B1 level), ---	
Objectives of the course and learning outcomes: Practice takes place in a hospital - rheumatology ward. The student is able to provide physiotherapy care, advice on the health related mode of life for patients with rheumatic disease, applies ethical rules with these patient, with their families, with his nearest environment and society.	
Teaching program: Students use their knowledge in practical action in direct work with patients under the supervision of a qualified therapists. Student performs physical therapy techniques, therapeutic exercises, massage techniques, physical modalities and other physiotherapy methods. All actions are adapted to the patient's condition and stage of the disease. The student learns to conduct medical records and data.	
Assessment methods: Practical assessment	
Recommended reading: No recomended reading for practical training	

Return to list of courses

Course name: **Functional Diagnostics and Rehabilitation Programming in Rheumathology**	
Course available with minimum number of 4 participants.	
Course code: F07	**Form of class:** Seminar,
Level of study: postgraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Łuniewski Jacek, j.luniewski@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level)	
Objectives of the course and learning outcomes: The course allows to acquaint students with techniques and methods used in diagnostic and rehabilitation programming in neurology of adults patients.	
Teaching program: Basics of programming the rehabilitation process, controlling its course and adapting the physiotherapeutic treatment to the aims of complex rehabilitation. Selection of physiotherapeutic procedures and methods appropriately for clinical recognition. Results control, keeping documentary. Planning and conduct physical therapy for patient with osteoarthritis. Planning and conduct physical therapy for patients with systemic connective tissue disease during exacerbations and remissions. Seronegative spondyloarthropathies: planning and carrying out a comprehensive medical rehabilitation proceedings. Repetition of acquired practical skills in the treatment of patients with rheumatic diseases. Assessment of planning and conducting a physical therapy session with a patient with a rheumatic disease.	
Assessment methods: Group project report	
Recommended reading: Karen Jones Neurological Assessment. Janet Carr. Neurological Rehabilitation : Optimizing motor performance Raj Glady Samuel. Physiotherapy in Neuro-conditions	

Return to list of courses

Course name: **Therapeutic Massage**	
Course code: F08	**Form of class:** Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Łuniewski Jacek, j.luniewski@po.opole.pl	
Prerequisites: English (min B1 level), Knowledge of anatomy and physiology	
Objectives of the course and learning outcomes: The subject programme introduces knowledge from range of massage theory and practical skills. Students are expected to explain theoretical basis of therapeutic massage, demonstrate the steps in preparing a room and patient for a massage session, give and adjust dosage of therapeutic massage.	
Teaching program: Physiological basis of therapeutic massage, massage mechanism of action, key concepts, terms and conditions. Ethics, work organization. Effect of massage on the human body, indications and contraindications for the massage. Technique and methodology of therapeutic massage on each area of the human body (upper limb, lower limb, low back area, the area of the neck, chest and abdomen). Types and varieties of massage (technique and methodology): segmental massage, spot, isometric massage, lymphatic massage. Therapeutic massage in different clinical situation.	
Assessment methods: Practical examination	
Recommended reading: 1. Beck M.: Theory and practice of therapeutic massage, 5th edition, Cengage Learning 2010 2. Hollis M. Jones E.: Massage for therapists. Wiley-Blackwell, 1998 3. Muscolino J.E.: The muscle and bone palpation manual with trigger points, referral patterns and stretching. Elsevier Health Sciences, 2014	

Return to list of courses

Course name: **Adapted sport and recreational physical activity**	
Course code: F10	**Form of class:** Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Stefaniak Wojciech, w.stefaniak@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level)	
Objectives of the course and learning outcomes: Acquire practical knowledge about adaptation of sport and recreational activities in different disabilities.	
Teaching program: Sport and recreation as an important part of rehabilitation. General rules for adaptation of physical activity for physical and sensorial disabled. Daily, recreational and sport activities on wheelchair and for amputees. Daily, recreational and sport activities for visual disabled. Rules for adaptation of activities for auditory disabled.	
Assessment methods: Individual or group project paper, individual or group project presentation, practical classes assessment	
Recommended reading: 1. Keith Gilbert, Otto Schantz: The Paralympic Games: Empowerment Or Side Show?: Meyer	

Return to list of courses

Course name: **Clinical Reasoning and ICF Model Based Rehabilitation**	
Course code: F11	**Form of class:** Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Stefaniak Wojciech, w.stefaniak@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level), Anatomy and functional anatomy, physiology	
Objectives of the course and learning outcomes: Acquire basic knowledge and skills for clinical reasoning in rehabilitation.	
Teaching program: The teaching classes are provided by following theme structure: 1. ICF model. 2. Assessment and evaluation of patient. 3. Data analysis. 4. Environmental factors. 5. Treatment planning. 6. Outcome measurements. 7. Evidence based rehabilitation.	
Assessment methods: Paper test examination, individual presentation, practical classes assessment	
Recommended reading: 1. International classification of functioning, disability and health (ICF), WHO 2001 2. Anne Shumway-Cook, Marjorie H. Woollacott: Motor Control, Translating Research into Clinical Practice: Lippincott Williams	

Return to list of courses

Course name: **Neurorehabilitation**	
Course code: F12	**Form of class:** Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Stefaniak Wojciech, w.stefaniak@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level), Spanish (min B1 level) Anatomy, physiology, movement therapy	
Objectives of the course and learning outcomes: Acquire theoretical and practical basic tools for evaluating and treatment planning of neurological patient.	
Teaching program: The program consists of following themes: 1. Normal and abnormal movement (motor control, postural control, movement analysis, environmental factors). 2. Assessment and evaluation in neurorehabilitation. 3. ICF model. 4. Facilitation of ADL activities. 5. Task oriented therapy. 6. Constraint induced movement therapy. 7. Treatment progression - taxonomy of tasks. 8. Orthotics. 9. Outcome measurements.	
Assessment methods: Paper test examination, individual presentation, practical classes assessment	
Recommended reading: 1. Janett Carr, Roberta Shepherd: Neurological Rehabilitation, Optimazing Motor Performance: Churchill Livingstone Elsevie 2010 2. Anne Shumway-Cook, Marjorie H. Woollacott: Motor Control, Translating Research into Clinical Practice: Lippincott Williams	

Return to list of courses

Course name: **Orthopedic and Sport Rehabilitation**	
Course code: F13	**Form of class:** Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Stefaniak Wojciech, w.stefaniak@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level), Anatomy and functional anatomy, physiology, movement therapy	
Objectives of the course and learning outcomes: Acquire theoretical and practical basic tools for diagnosis and treatment planning in the field of orthopedic and sport rehabilitation.	
Teaching program: The teaching is led by following theme's structure: 1. Postural control and motor control. 2. Normal and pathological movement analysis. 3. Trauma and its implications. 4. General approach in acute stage of injury. 5. Orthopedic examination. 6. General approach in subacute and chronic stage of injury. 7. Common pathologies of ankle, knee, hip, shoulder, elbow, wrist and hand. 8. Treatment in selected pathologies of lower and upper limb. 9. Treatment planning. 10. Prevention and long-term care. Orthotics.	
Assessment methods: Paper test examination, individual presentation, practical classes assessment	
Recommended reading: 1. Ludwig Ombregt: A System of Orthopaedic Medicine: Elsevier Health Sciences, 2013 2. Bruce C. Reider, George J. Davies, Matthew T. Provencher: Orthopaedic Rehabilitation of the athlete: 3. Christer Rolf: The Sports Injuries Handbook, diagnosis and management: A	

Return to list of courses

Course name: **Lymphatic drainage**	
Course code: F14	**Form of class:** Seminar,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Rutkowska Anna, a.rutkowska@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level), min. 3 students to start the course	
Objectives of the course and learning outcomes: The student will be prepared to conduct manual lymphatic drainage	
Teaching program: Anatomy Of The Lymphatic System, Insufficiency Of The Lymphatic System. Pathophysiology Of Edema. Transport Of Lymphatic System.Kinds Of Edema (Swelling With Low Protein Content – Transudate. Swelling With A High Content Of Protein- Exudate, Lymphedema).Characteristics Of Lymphoedema. Consequences Of Lymphedema.Treatment Of Lympedema (Manual Lymphatic Drainage, Compression: Wrapping , Compression Garment , Pneumatic Compression , Hygiene Of The Skin, Exercises With Limb Compression ,Elevation Position Of The Limbs).Indications And Contraindications For The Use Of Mdl And Comprehensive Resealing Therapy. The Basic Principles Of Mdl-Grips. •Practical Classess. Methods Of Manual Lymphatic Drainage.	
Assessment methods: Group project report	
Recommended reading: Wittlinger Hildegard. Dr. Vodder's Manual Lymph Drainage French Ramona Moody. Complete Guide to Lymph Drainage Massage Foldi Professor Dr. Michael. Foundations of Manual Lymph Drainage	

Return to list of courses

Course name: **Physiotherapy in gynecology and obstetrics**	
Course code: F15	**Form of class:** Seminar,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** February
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Rutkowska Anna, a.rutkowska@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level), min. 3 students to start the course	
Objectives of the course and learning outcomes: The student will be prepared to conduct manual lymphatic drainage	
Teaching program: Physiotherapy during pregnancy, physiotherapy in the puerperium, physiotherapy after cesarean section. Low back pain during pregnancy and after puerperium. (Massage, kinesiotaping applications, manual therapy treatments and prevention) The role of pelvic floor muscle during pregnancy after childbirth and in incontinence problem. Training of pelvic floor muscle. Physiotherapy in the separation of the rectus abdominal muscle. Role of physiotherapy during lactation problems. Indication and contraindication for massage during pregnancy. Physiotherapy after cesarean section. Scar mobilization. Physiotherapy after mastectomy.	
Assessment methods: Group project report	
Recommended reading: Llewellyn - Jones Derek, Fundamentals of Obstetrics and Gynaecology. Rost Cecile C. M. Relieving Pelvic Pain During and After Pregnancy Curtis Dr Glade B M.D. Rost Cecile C. M. Relieving Pelvic Pain During and After Pregnancy	

Return to list of courses

Course name: **Biomechanical assessment of the musculoskeletal system**	
Course code: F17	**Form of class:** Lecture, Laboratory,
Level of study: postgraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Mojza Karolina, k.mojza@po.edu.pl	
Prerequisites: English (min B1 level), English (min B1 level)	
Objectives of the course and learning outcomes: Student can describe and use of different methods used in diagnostics of musculoskeletal system. Student can interpret outcome of different methods used in diagnostics of musculoskeletal system.	
Teaching program: 1. 1. Assessment of the muscles – biomechanical characteristics of the muscle. Methods use in assessing muscles (myometry, electromyography, dynamometer) 2. Assessment of the joint motion quality – biomechanical characteristic of joint cartilage, Assessment of arthrokinematic motion using vibroarthrography 3. Balance assessment – definition of balance. Methods use in assessing balance in static and dynamic conditions 4. Complex movement analysis using MyoMotion System 5. Gait analysis – gait characteristics, physiological and pathological types of gait, biomechanical gait analysis	
Assessment methods: presentation and/or practical classes assessment	
Recommended reading: 1. Joint Structure and Function: A Comprehensive Analysis - P. Levangie, C. Norkin 2. Whittle's Gait Analysis - D. Levine, J. Richards, M. Whittle 3. Functional Anatomy: Musculoskeletal Anatomy, Kinesiology, and Palpation for Manual Therapists – C. Cael 4. Papers published on topics presented at class	

Return to list of courses

Course name: **Marketing**	
Course code: TR01	**Form of class:** Group tutorial, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Hołodnik Daria, d.holodnik@po.opole.pl	
Prerequisites: English (min B1 level), Basics of Marketing, Basics of Communication and Negotiations	
Objectives of the course and learning outcomes: This course focuses on developing skills and competency in the core functions in the process of management: planning, organizing, directing, motivating, controlling.Students are required to use tools and instruments to solve problems in the organizations. They are also expected to deal with knowledge of specific procedures within the management function.The course provides an overview on activities aimed at effective use of human teams and material means taken to achieve its objectives.	
Teaching program: The program is led by following themes structure: - Basics concepts of marketing - Marketing environment - Marketing mix - Consumers on the market - Segmentation, marketing instruments - Product, price, place, promotion - Marketing strategy	
Assessment methods: Written examination, practical classes assessment.	
Recommended reading: 1. Ph. Kotler,G. Armstrong, Principles of marketing, Global Edition, 14/E, Pearson Higher Education, 2012 2. Gary Armstrong, Philip Kotler, Marketing : an Introduction /. - 7th ed. - Upper Saddle River : Prentice-Hall, 2005. 3. Lecture notes.	

Return to list of courses

Course name: **Tour Guiding**	
Course code: TR02	**Form of class:** Group tutorial, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Hołodnik Daria, d.holodnik@po.opole.pl	
Prerequisites: English (min B1 level), Basics of Tourism English (min B1 level)	
Objectives of the course and learning outcomes: Methodical knowledge about guiding a tourist group. Organizational knowledge about tourist events. Social and psychological approaches for guiding tourist group	
Teaching program: Competition specification needed for working as a guide The profile competence specification for working as a tourist guide (in regard to: low system in EU, recruitment process in travel agencies, personal continuous improvement). Organizational aspects of guiding bus and airplane tourist group. Constructing announcements to the tourist group during standard and accidental situations. Planning the information and knowledge diffusion while having city guiding. Determinants of successful guiding in context of tourist relationship management. Modern technics of interactive communication with the tourist group (narration analysis).	
Assessment methods: Individual project report and presentation, practical classes assessment, written test.	
Recommended reading: 1.Prince: The art of guiding, The Institute of Tourism Guiding, 2nd ed., 2008; 2.Weaver, Lawton: Tourism Management, J. Wiley	

Return to list of courses

Course name: **Physiotherapy Clinic Management**	
Course code: TR03	**Form of class:** Group tutorial, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Hołodnik Daria, d.holodnik@po.opole.pl	
Prerequisites: English (min B1 level), Basics of Management and Economics English (min B1 level)	
Objectives of the course and learning outcomes: Practical knowledge about service problems in physiotherapeutic clinic. Business modeling based on client value co-creation paradigm.	
Teaching program: 1. Types of business models of physiotherapeutic clinic due to traditional and creative industries. 2. Holistic, virtual and knowledge based approaches in managing physiotherapeutic service. 3. Client service management. 4. Client value management in different types of physiotherapeutic clinic (SPA, medical clinic, fitness club etc.). 5. Designing the processes of delivering solutions to client's problems.	
Assessment methods: Paper examination, practical classes assessment	
Recommended reading: 1.Ramaswamy, Ozcan: The Co-creation Paradigm, Stanford Business Books, 2014 2.Strickdorn, Schneider: This is service design thinking: Basics, Tools, Cases, J. Wiley	

Return to list of courses

Course name: **Hospitality and Food Management**	
Course code: TR04	**Form of class:** Group tutorial, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Hołodnik Daria, d.holodnik@po.opole.pl	
Prerequisites: English (min B1 level), Basics of Marketing, Basics of Communication and Negotiation English (min B1 level)	
Objectives of the course and learning outcomes: Knowledge about serivce management in a hotel by using advanced coaching tools.	
Teaching program: Information, knowledge and energy management as a source of developing self- awareness and potentiality. Practical usage of the knowledge and wisdom pyramid (psychological and social perspective). Coaching as the tool of harmonizing the knowledge asymmetry in the company. Coaching as the method of client problem searching and defining. Types of client problems (personal, professional, health, mental, etc.) and the differentiation of delivery solutions methodology. Recognizing and building up relation between coach and coaches. Coaching as professional consulting process (within company e.g.: between employer and employee). Study case of various coaching implementation models. Conditions, circumstances and determinants of coaching success.	
Assessment methods: Oral and written paper examination	
Recommended reading: 1.Bouncken, Pyo: Knowledge Management in Hospitality and Tourism, Taylor and Francis, 2009; 2.McLeod, Vaughan: Knowledge Networks and Tourism, Taylor and Francis , 2014; 3.Lecture notes	

Return to list of courses

Course name: **Tourism Product**	
Course code: TR05	**Form of class:** Group tutorial, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Hołodnik Daria, d.holodnik@po.opole.pl	
Prerequisites: English (min B1 level), Basics of Marketing, Basics of Communication and Negotiation, Basics of Sociology, English (min B1 level)	
Objectives of the course and learning outcomes: Knowledge and skills about tourist product composing methods and its implementation into health services market.	
Teaching program: Structure and characteristics of tourist products (basic, extend, realistic psychological and potential product). Tourist product meaning in regard to B2B, B2C, B2M markets. Traditional and knowledge based health product.. Identification and detection of client preferences. Knowledge based client segmentation Standardisation, individualisation and personalization in product composing. Methodology of product co-creation according to client health program. Variants of shaping, communicating and delivering client values. Life-long client value management in case study.	
Assessment methods: Coursework, group project and presentation, test paper examination.	
Recommended reading: 1.Tresidder, Hirst: Marketing in Food, Hospitality, Tourism and Events: a critical approach, Goodfellow Publishers, 2012; 2.Strickdorn, Schneider: This is service design thinking: Basics, Tools, Cases, J. Wiley	

Return to list of courses

Course name: **Agro and Ecotourism**	
Course code: TR06	**Form of class:** Seminar,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Woś Barbara, b.wos@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level)	
Objectives of the course and learning outcomes: Student evaluates the potential of the natural environment and the possibilities of its use in agro and ecotourism , is able to develop agro and ecotourism product. Student is able to adapt the agro and eco- tourism offer to the needs of the market.	
Teaching program: Basis of agro and ecotourism in Poland and other countries (types of farms, main group of clients, typical offer, environmental and economic aspects). Case studies different agro and Eco farms and offers. Two terrain trip to selected Agro and Eco farms. How to prepare the agro and ecotourism product (step by step from beginning till working farm). Practical work - project of agro or Eco farm.	
Assessment methods: Group projetc	
Recommended reading: 1. S.J. Page, R. K. Dowling, Ecotourism, Prentice Hall, London 2002. 2. G. Holly, R.Ellie, Marketing starategies for agrotourism operation, University of California, 2011 3. L. Roberts, D. Hall, Rural tourism and recreation: Principles to practice. Cambridge: CABI Publishing 2001	

Return to list of courses

Course name: **Management**	
Course available with minimum number of 4 participants.	
Course code: TR07	**Form of class:** Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Hołodnik Daria, d.holodnik@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level)	
Objectives of the course and learning outcomes: This course focuses on developing skills and competency in the core functions in the process of management: planning, organizing, directing, motivating, controlling. Students are required to use tools and instruments to solve problems in the organizations. They are also expected to deal with knowledge of specific procedures within the management function. The course provides an overview on activities aimed at effective use of human teams and material means taken to achieve its objectives. After completing this course student has ability to make the correct selections of method and management techniques. Students can evaluate business decision and communicate properly within the designated organisational roles.	
Teaching program: Basic concepts and definitions of management and organization / management, managerial functions, organization, elements of organizations, resources, manager's job, levels of management/ The Environment of Organizations / general and task environment, internal elements in the organization/ Planning and Managing Decision Making./ different types of plans, steps in the planning process, Identify components in the process of decision making/Organizing. Organization Structure and Design / major elements of organizational structure, factors affecting organisational structure/ Managing Organizational Change / areas of organizational changes, resistance to change techniques to managing changes effectively/ Managing Human Resources and motivating / concepts, models of motivation, what the HRM is/ Leadership and management styles / 6 management styles/ Managing work groups of employees. Effective interpersonal communication./ techniques to manage people, examples of different types of communication/ Strategic management / steps In the process of strategic planning, mision, Visio, golas, implementing/ Process of controlling.	
Assessment methods: Written papers, activity during classes, practical classes assessment.	
Recommended reading: 1.Ricky W. Griffin, Management, 10th Edition, Texas A	

Return to list of courses

Course name: **Marketing of Tourism and Leisure**	
Course code: TR10	**Form of class:** Group tutorial, Project,
Level of study: postgraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Hołodnik Daria, d.holodnik@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level), Basics of Communication and Negotiations	
Objectives of the course and learning outcomes: Practical knowledge about marketing communication between company and its clients. To get familiar with the modest marketing tools that can be applied across service based organization (functioning on leisure and touristic services market, e.g.: travel agency, fitness center, ecotourism farm, hotels, restaurants etc.)	
Teaching program: Analysis of features of traditional and postmodern marketing approaches used by a tourism and leisure service company. Impact of virtualization and digitalisation: reorientation in marketing philosophy making. Practical exploitation (case study analysis) of following marketing models, methods and concepts: •transactional (quantitative tools) CRM (customer relationship management), •psychological (qualitative tools) CRM, •sensory marketing, •experience marketing, •entrainment and event marketing. Differentation of criteria in client segmentation and product placement.	
Assessment methods: Individual or group project paper report and presentation, practical classes assessment	
Recommended reading: 1.Tresidder, Hirst: Marketing in Food, Hospitality, Tourism and Events: a critical approach, Goodfellow Publishers, 2012; 2.Ramaswamy, Ozcan: The Co-creation Paradigm, Stanford Business Books, 2014; 3.Lecture notes.	

Return to list of courses

Course name: **Travel Consultancy**	
Course code: TR11	**Form of class:** Lecture, Group tutorial, Project,
Level of study: postgraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Hołodnik Daria, d.holodnik@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level), Basics of Marketing, Basics of Communication and Negotiation	
Objectives of the course and learning outcomes: Familiarization with diagnostic methodology of information and knowledge flows. Comprehending consulting tools.	
Teaching program: Basics of information and knowledge management in profit and non-profit oriented tourism companies. The pyramid of wisdom. Creating a meaning field of a tourism organization (information flows and values) and a tourist (diagnosing priority preferences and key expectations of the tourist). Detection method of sharing and relating meaning fields. Tourist education as a new trend in travel consulting. The essence of consultancy (definition, types and approaches of coaching). Coaching as professional consultancy. Tourist's problem solving (relationship making between a coach and coachee). Study case of various coaching implementation models. Planning of the coaching phases and sessions.	
Assessment methods: Individual project paper report and presentation, practical classes assessment	
Recommended reading: 1.Bouncken, Pyo: Knowledge Management in Hospitality and Tourism, Taylor and Francis, 2009; 2.McLeod, Vaughan: Knowledge Networks and Tourism, Taylor and Francis , 2014; 3.Lecture notes	

Return to list of courses

Course name: **Relaxation and regeneration methods**	
Course code: TR12	**Form of class:** Seminar,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Hołodnik Daria, d.holodnik@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level)	
Objectives of the course and learning outcomes: Comprehending relaxation and regeneration methods in the context of having a stressful lifestyle.	
Teaching program: 1. Mental harmony and balance between mind-energy and body. 2. Methods of harmonious breathing. 3. Stretching exercises (in coordination with breathing). 5. Regeneration at SPA and Wellness. 4. Self-observation and self-awareness.	
Assessment methods: Individual project	
Recommended reading: 1.Michael K. Simpson ; Unlocking Potential: 7 Coaching Skills That Transform Individuals, Teams, and Organizations, Brilliance Publishing, 2014. 2.Knowles Ann-Marie, Social Psychology in Sport and Exercise Linking Theory to Practice, Palgrave Macmillan Higher Ed, 2015 3.Lecture notes	

Return to list of courses

Course name: **Wine Tourism**	
Course code: TR18	**Form of class:** Lecture, Group tutorial, Project,
Level of study: postgraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Hołodnik Daria, d.holodnik@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level), Tourism basics	
Objectives of the course and learning outcomes: To get familiar with the wine tourism business models	
Teaching program: 1.Wine Industry and Wine Tourism 2.Networking levels of wine tourism 3.Wine routes in Europe 4.Wine routes in Poland 5.Study design of wine farm’s business model 6.Behavioral analysis of wine customers and wine tourists 7.Wine festivals 8.Business models of wine farms in Poland 9.Business models in wine farms in Europe	
Assessment methods: practical classes assessment	
Recommended reading: 1.Hołodnik D., Business models of wine agrotourism farms, CeDeWu, Warsaw, 2017 2.Carlsen J., Charters S. (eds.), Global wine tourism: research, management and marketing, CAB International, 2006 3.Own notes	

Return to list of courses

Course name: **Alpine Skiing**	
Course code: TR20	**Form of class:** Seminar,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Bień Wojciech, w.bien@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level)	
Objectives of the course and learning outcomes: Practical skills: independent and safe skiing based on parallel technique. Theoretical knowledge about ski technique, safety in ski areas, ski equipment.	
Teaching program: 1. Safety in mountains 2. Division, selection and maintenance of ski equipment 3. Analysis of the basic issues of ski technique 4. Basic level of skiing: -taming with equipment and the environment -perfecting balance -moving around in a flat area -changes to the position relative to the slope -approaching -safe falling and lifting -skating step -plow -plow turns 5. Medium level of skiing: -slides -parallel turn	
Assessment methods: physical activities, outdoor camp, practical exam, written exam	
Recommended reading: 1.Le Master R., Ultimate Skiing: Master The Techniques Of Great Skiing, Human Kinetics, 2010 2.Smith W., Go Ski, DK Pub., 2006 3.Lecture notes	

Return to list of courses

Course name: **Theory and Methodology of Team Sport - Volleyball**	
Course code: WF01	**Form of class:** Lecture, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Borzucka Dorota, d.borzucka@po.opole.pl	
Prerequisites: English (min B1 level), Physical education, biology, physics, English (min B1 level)	
Objectives of the course and learning outcomes: Skills in teaching technical elements, basics of judging	
Teaching program: The subject programme covers the basic knowledge of methodology and specific exercises of the volleyball techniques, methods and forms of teaching volleyball, mastering practical elements and techniques for playing volleyball, knowledge and skills to enforcing regulations of the game. A particular focus is given on assimilation knowledge concerning individual and team tactics at the volleyball meeting.	
Assessment methods: Practical classes assessment	
Recommended reading: 1.http://www.fivb.com 2.Officjal Volleyball Rules 2017-2020 (FiVB) 3.Officjal Beach Volleyball Rules 2017-2020 (FiVB)	

Return to list of courses

Course name: **Theory and Methodology of Individual Sports - Swimming**	
Course available with minimum number of 4 participants.	
Course code: WF02	**Form of class:** Lecture, Seminar,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 3	**Number of hours per semester:** 45
Language of instruction: English	
Name of the lecturer and contact information: Wieloch Marcin, m.wieloch@po.opole.pl	
Prerequisites: English (min B1 level), Physical education, biology, physics, English (min B1 level)	
Objectives of the course and learning outcomes: Skills in teaching technical elements swimming, basics of judging.	
Teaching program: The subject programme covers the basic knowledge of methods of teaching swimming to children and youth; regulations and rules binding during a swimming competition, the procedure and action in case of threat of the human life in water.	
Assessment methods: Practical classes assessment	
Recommended reading: 1.http://www.polswim.pl/ 2.http://www.fina.org/ 3.http://www.len.eu/	

Return to list of courses

Course name: **Didactics of Physical Education**	
Course code: WF03	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 3	**Number of hours per semester:** 45
Language of instruction: English	
Name of the lecturer and contact information: Kuśnierz Cezary, c.kusnierz@po.opole.pl	
Prerequisites: English (min B1 level), Basic knowledge of pedagogical-psychological and bio-medical subjects. English (min B1 level).	
Objectives of the course and learning outcomes: The aim of the course is to acquaint students with the contemporary goals of physical education, basics principles of diagnosis of physical development, planning and evaluation of PE teaching in primary and secondary schools and to help them to become a competent and professional PE teacher. Students will gain the methodic competencies in leading, organization and planning of educational process as well as the creativity and skills to link up an individual scientific development with pedagogical practice.	
Teaching program: Methodics of physical education as a subject of studies. The contribution of PE methodics into an occupational preparation. Hierarchy of contemporary objectives of physical education. Principles of teaching-learning. Process of motor skills teaching. Shaping of the motor abilities in a physical education lessons. Intellectualisation of physical education. Knowledge as a basis for achieving pro-health competences. Individualisation in the PE process. Organisation and conducting lessons of PE. Methods and forms of physical education. The rules of selection of didactical means. Selection of exercises for the needs of lesson. Types of physical education lessons. Conspectus as a detailed plan of physical education lesson. Basic principles of elaboration. Safety conditions according to the applied methods and forms of exercises. Annual plan for the class. Grading and evaluation. Regulations and tasks of the school sport.	
Assessment methods: Conspectus of PE lesson in difficult conditions. Annual plan for the class. Oral examination.	
Recommended reading: 1. Madejski E., Pośpiech J., Węglarz J.: Identity of Polish Physical Education- European background. The State Higher Vocational School in Tarnow 2012. . 2. Pośpiech J.: Physical education and school sport in European perspective-comparative studies. Towarzystwo Naukowe Kultury Fizycznej. Państwowa Wyższa Szkoła Zawodowa w Raciborzu. 2006. 3. Pośpiech J.: Identity of contemporary physical education – crisis or evolution? (in)European Journal of Physical	

Return to list of courses

Course name: **Summer Training Camp**	
Course code: WF04	**Form of class:** Seminar,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** February
Number of hours per week: 60	**Number of hours per semester:** 900
Language of instruction: English	
Name of the lecturer and contact information: Wieloch Marcin, m.wieloch@po.opole.pl	
Prerequisites: English (min B1 level), Physical education, biology, physics, English (min B1 level)	
Objectives of the course and learning outcomes: Fun and Games movement, theory and methodology of individual and team sports, teaching physical education, history of physical culture	
Teaching program: During the summer camp program, students learn the principles of organizing and conducting summer recreation of children and youth. Become familiar with the rules and principles of swimming in open water, games and activities field. During the course of sailing, students learn to build and labeling watercraft. The basic principles of maneuvering Sailboat dealer and windsurfing. Students also learn in the field of the advantages of practicing canoeing and kayaking. The combined skills acquired during a summer camp allow in the future safely and actively organize time pupils during the summer holidays on the water bodies.	
Assessment methods: Practical classes assessment	
Recommended reading: 1. www.open-water.pl 2. www.wopr.pl 3. www.polswim.pl 4. www.zeglarstwo.org.pl 5. www.windsurfing.pl	

Return to list of courses

Course name: **Theory and Methodology of Team Sport - Basketball**	
Course code: WF05	**Form of class:** Lecture, Seminar,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Nawarecki Dariusz, d.nawarecki@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level)	
Objectives of the course and learning outcomes: The aim of the course is to acquaint students with a theory and teaching methodology of basketball game. The course is dedicated to presenting its position and function in the curriculum of comprehensive education, and the main tasks are related to getting the knowledge of teaching methodology, mastering the elements technique and tactics of playing the basketball game.	
Teaching program: The program is conducted by following thematic modules: 1. History of basketball. 2. Standards of teaching, organization of teaching, methods of physical activity teaching. 3. Profile of basketball game, the basics of game instruction. 4. Moving on the field without the ball. 5. Additional measures – dribbling. 6. Additional measures – passing and holding. 7. Main measures – basketball shots. 8. Double forms of cooperation in offensive action. 9. Basics rules of offense. 10. Fast offense, half court offense. 11. Action control of the player during the game. 12. Individual defense of player guarding with or without the ball. 13. Team defense. 14. Mini basketball – targets, rules and game instruction. Basketball games organization.	
Assessment methods: Practice test, teaching during the part of the classes, classes' observation, discussion	
Recommended reading: 1. Arlet T.: Koszykówka podstawy Techniki i taktyki gry. Exterma Kraków 2001 Syg.BWF:XI G 21,XI G 22, XI G 28, 2. Dembiński J.: Zasób ćwiczeń w nauczaniu podstaw techniki gry w koszykówkę. AWF Wrocław 1993 Syg. BWF: XI G 6 3. FIBA.: Oficjalne przepisy gry w koszykówkę. www.pzkosz.pl	

Return to list of courses

Course name: **Human Kinetics/ Anthropomotorics**	
Course code: WF06	**Form of class:** Laboratory, Project, Seminar,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Borysiuk Zbigniew, z.borysiuk@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level)	
Objectives of the course and learning outcomes: The aim of the course is to acquaint students with problems and the theory of motor abilities as a scientific issue covering the whole aspect of human motor activities in its complex and conditions. The main task is to present the essence of the problems, structure, changeability and conditions of human motor abilities.	
Teaching program: The programme is conducted according to the following themes modules: 1.Introduction to the Motor Control ideas, 2.Reviewing of the Kinetics Movement history, 3.Metodology aspects in research procedures of Human Kinetics fields, 4.Neurophysiological background of Motor Control, 5.Neuroplasticity as a basis of diagnostic neuromuscular activity, 6.Practical training in laboratory	
Assessment methods: Laboratory report, presentation.	
Recommended reading: 1. Schmidt R., Motor Control and Learning, Champaign IL: Human Kinetics, 1982. 2. Enoka R., Neuromechanics of Human Movement. Champaign IL: Human Kinetics, 2008. 3. Kelso J. Dynamic Patterns, Cambridge: MIT Press. 1995.	

Return to list of courses

Course name: **Theory and Methodology of Individual Sports - Gymnastics**	
Course code: WF07	**Form of class:** Group tutorial, Seminar,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Sojka-Krawiec Katarzyna, k.sojka-krawiec@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level)	
Objectives of the course and learning outcomes: The purpose of the course is to prepare students to teaching work on gymnastics at all level schools, non-school establishments as well as at the higher education institutions. Division of gymnastics and gymnastic exercises, their role in shaping of general physical fitness and assimilation of terminology for exercise planning. Key features of the forms of agility exercises, system and methodology of teaching various exercises. PE at school and main issues of methodology	
Teaching program: The practising classes are conducted by following themes structure: 1. Introduction of security rules during exercising on the gymnastic machines. 2. How muscles corpus, arms and legs works during gymnastic exercising- explanation and sample performing. 3. Gymnastic movement training programs- specification of equipment and tools. 4. Methodical aspects of the gymnastic training application in the PE at primary schools. 5. Particular classes assessment according to the gymnastic phases of practitioner development. 6. Apprehending of gymnastic assecuration methods. 7. Self- examining of gymnastic ability (flexibility, agility, elasticity etc.).	
Assessment methods: Practical classes assessment	
Recommended reading: 1. www.fig-gymnastics.com 2. Lecture notes.	

Return to list of courses

Course name: **Health Education**	
Course code: WF08	**Form of class:** Seminar,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Nowak Paweł, p.nowak@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level)	
Objectives of the course and learning outcomes: Preparing students for implementing tasks in the teaching profession - tasks related to promoting health in the school community and the environment surrounding the school - is the aim of the subject.	
Teaching program: •Health literacy as contemporary public health challenge •Schools for Health in Europe Network - concept and functioning •Relations between physical education with health education •Physical education teacher as health educator •Activating methods used in health education •Didactic aids used in health education •Organization of health promoting events •Stages and principles of planning the health promotion program •Rules for developing the class scenarios •Evaluation in health education	
Assessment methods: practical classes assessment (project)	
Recommended reading: 1. Corbin C. B., Welk G. J., Corbin W.R., Welk K. A. (2006). Fundamental concepts of fitness and wellness with nutrition update. McGraw-Hill, New York 2. Downie R. S., Fyfe C., Tannahill A.(1994). Health promotion. Models and Values, Oxford University Press, New York. 3. Gilbert G. G., Sawyer R. G., McNeill E. B. (2011). Health education. Creating strategies for school and community health. Jones and Bartlett Publishers, Sudbury, Massachusetts.	

Return to list of courses

Course name: **Basics of Self-Defence**	
Course code: WF09	**Form of class:** Group tutorial, Seminar,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Kuśnierz Cezary, c.kusnierz@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level)	
Objectives of the course and learning outcomes: Learning various techniques of self-defence	
Teaching program: Exercises of physical fitness, stretching. Learning releases from the grip of the hand , clothes. Ways to move in the fight position. Learning foot techniques- knee attack and defense form, kick forward and block ways. Circular kick and block ways. Hand techniques – various methods of attack and defense. Combinations of hand and foot techniques, forms of attack and defense. Ways to defend against head attacks. Learning pads forward, back, side. Defense against suffocation. Ways of avoiding threats, defensive behavior.	
Assessment methods: Practical classes assessment	
Recommended reading: 1. https://lifehacker.com/basic-self-defense-moves-anyone-can-do-and-everyone-sh-58255... 2. https://www.amazon.co.uk/Self-Defence...book.../153311322X 3. https://www.amazon.com/...Book-Self-Defense-Bruce.../08740703	

Return to list of courses

Course name: **Linear algebra with analytic geometry**	
Course code: T001	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 4	**Number of hours per semester:** 60
Language of instruction: English	
Name of the lecturer and contact information: Ścięgosz Hanna, h.sciegosz@po.opole.pl	
Prerequisites: English (min B1 level), Fundamental and relatively basic knowledge on mathematics beyond arithmetic.	
Objectives of the course and learning outcomes: The goal of this lecture comes to know the algebraic notations and to apply them to solve some technical problems.	
Teaching program: 1. Foundations of logic, types of proofs, mathematical induction; 2. Algebra of sets and subsets; 3. Algebraic structures: group, ring, field; 4. Complex numbers; 5. Rational functions, polynomials and partial fractions; 6. Matrices, matrix algebra 7. Square matrices; determinants, Laplace's formula; 8. Adjugate matrix, inverse matrix; 9. Systems of linear equations; 10. Cramer's rule; 11. Rouché–Capelli theorem; 12. Gauss–Jordan elimination; 13. Vector spaces, linear independence, bases of linear spaces, spanning vectors and spanned spaces; 14. Eigenvectors and eigenvalues of square matrices; 15. Three-dimensional analytic geometry (scalar and vector products, planes, straight lines, surfaces of second order).	
Assessment methods: Written and oral assessment, individual elaborate, two written tests during semester and written final exam.	
Recommended reading: 1. K.R. Matthews, Elementary linear algebra, Univ. of Queensland, Press 1991 2. D.J. Winter, A Primer of Linear Algebra, Macmillan, Press 1988 3. M. Artin, Algebra, Prentice Hall, 1991 4. W. L. Perry, Elementary Linear Algebra, MacGraw-Hill, 1988	

Return to list of courses

Course name: **Differential Equations**	
Course code: T003	**Form of class:** Lecture, Seminar,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Ścięgosz Hanna, h.sciegosz@po.opole.pl	
Prerequisites: English (min B1 level), Fundamental knowledge of mathematics, an elementary course of mathematical analysis, differential and integral calculus of functions of one and several variables (Mathematics I and Mathematics II courses), ability to calculate derivatives and integrals quickly.	
Objectives of the course and learning outcomes: To introduce students to methods of solving of differential equations and modeling via differential equations. To present their applications.	
Teaching program: 1. Introduction and First Definitions; 2. First Order Differential Equations (Separable Equations, Homogeneous Equations, Linear Equations, Bernoulli Equations, Darboux Equations, Riccati Equations, Exact and Non-Exact Equations, Integrating Factor technique, Numerical Technique: Euler's Method) 3. Existence and Uniqueness of Solutions, Picard Iterative Process; 4. Second Order Differential Equations (Reduction of Order, Euler-Cauchy Equations); 5. Higher Order Linear Equations (Homogeneous Linear Equations with Constant Coefficients, Non-Homogeneous Linear Equations, Method of Undetermined Coefficients, Method of Variation of Parameters, Linear Independence and the Wronskian); 6. Systems of Differential Equations (Second Order Equations and Systems, Euler's Method for Systems, Linear Systems, Qualitative Analysis of Linear Systems).	
Assessment methods: Written and oral assessment, individual elaborate, written final exam.	
Recommended reading: 1. P. Blanchard, R. L. Devaney, G. R. Hall, Differential equations, Cengage Learning, 2006; 2. J. C. Robinson, An introduction to ordinary differential equations, Cambridge University Press, 2004; 3. R. Bronson, E. J. Bredensteiner, Differential equations, McGraw-Hill Professional, 2003. 4. B. Sikora, E. Łobos, A First Course in Calculus, Wydawnictwo Politechniki Śląskiej, 2007;	

Return to list of courses

Course name: **Ecology**	
Course code: T004	**Form of class:** Lecture, Seminar,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Hnydiuk-Stefan Anna, a.hnydiuk-stefan@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level).	
Objectives of the course and learning outcomes: Knowledge of the risks to the environment and the rules in environmental management systems. Global climate change and mechanisms to avoid it. Knowledge of the use of fossil fuels - non-renewable and renewable energy sources and the impact of their use on the environment. The student is able to: plan waste management in the company; to assess the risks to the environment and the manner of their elimination to provide enviromnental protection and is able to determine the priorities for the company's environmental management systems.	
Teaching program: 1. The greenhouse gases effect, greenhouse gas emissions into the atmosphere. 2. European Union emissions trading scheme 3. Clean Development Mechnisms. 4. Joint Implementation projects. 5. Emissions of harmful substances into the air. 6. Environmental aspects of energy conversion. 7. Renewable energy sources. 8. Energy efficiency. 9. Carbon management. 10. Waste management.	
Assessment methods: Course is assessed by a combination of written work and presentation	
Recommended reading: 1. Thampapillai D., Environmental Economics: Concepts, Methods and Policies, Oxford University Press, Melbourne 2006. 2. Bartnik R., Bartnik B., Hnydiuk-Stefan A: Optimum Investment Strategy in the Power Industry. Mathematical Models. Springer, New York 2016. 3. EU ETS Directive 2009/29/EC.	

Return to list of courses

Course name: **Entrepreneurship for Engineers**	
Course code: T006	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Hnydiuk-Stefan Anna, a.hnydiuk-stefan@po.opole.pl	
Prerequisites: English (min B1 level), Basic in management	
Objectives of the course and learning outcomes: The main objective of a course is to explore the entrepreneurial spirit. It is a key source of development for all companies of all sizes and industries. The course provides students with an ability to function multidisciplinary teams and to communicate effectively. It is crucial for create and present a business plan for a new technology idea. The course provide also the background, tools, and human skills to participate in the entrepreneurial process.	
Teaching program: The course will include issues such as: a) Product, Market, Sales, and Technology analysis. b) Opportunity identification and solution development: how to identify market trends and innovations that can lead to exciting new products and services. c) Learning, decision-making and leadership: how to form and manage product development teams. d) Explores the role of development and manufacturing partners. e) Entrepreneurship in its various forms, including startup growth ventures, entrepreneurship in small and medium enterprises, and microbusinesses.	
Assessment methods: Evaluation of individual presentations and also attention, punctuality, learning willingness.	
Recommended reading: a) Whittaker D.H.: Comparative Entrepreneurship: The UK, Japan, and the Shadow of Silicon Valley.Oxford Scholarship, 2011. b) Drucker P.: Innovation and Entrepreneurship. The Classic Drucker Collection, 2007. c) Lowe R., Marriott S.: Enterprise: Entrepreneurship and Innovation: Concepts, Contexts and Commercialisation, Oxford and Burlington, MA: Butterworth-Heinemann 2006.	

Return to list of courses

Course name: **Fundamentals of Management (at Faculty of Production Engineering and Logistics)**	
Course code: T007	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Hys Katarzyna, k.hys@po.opole.pl	
Prerequisites: English (min B1 level), Basic knowledge in the scope of the management.	
Objectives of the course and learning outcomes: The aim of the course is to learn the elementary principles of management. Will be presented, among others: precursors, management ideas, concepts, basic strategy. It gives the introduction into all areas of management.	
Teaching program: 1. Idea of Management. 2. Fundamentals of Management in the context of precursors. 3. The fundamental principles of management 3a. Planning: Problem Solving and Decision Making, Strategic and Operating Plan 3b. Organizing work: job design, authority and delegating work 3c. Motivation: incentive systems in the organization 3d. Control: the idea, areas, methods of control. 4. Human Resources Management. 5. Organizational Behaviour.	
Assessment methods: activity, systematic work in the classroom, preparing reports for the issues.	
Recommended reading: 1. Quinn S., Management Basics Bissett School of Business, 2013, http://bookboon.com/en/management-basics-ebook 2. Griffin R.W., Fundamentals of management, South-Western College Pub, 2011. 3. Robert Lussier R., Management Fundamentals: Concepts, Applications, Skill Development, Cengage Learning, 2008.	

Return to list of courses

Course name: **Industrial Marketing**	
Course code: T008	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Hys Katarzyna, k.hys@po.opole.pl	
Prerequisites: English (min B1 level), Basic knowledge in the scope of the management	
Objectives of the course and learning outcomes: Acquainting students with bases of industrial marketing, including cells, tasks, functions, strategies, instruments and essential methods are a purpose of the object. Exploiting the wisdom in practice is significant - this process is being carried out on exercise classes as part of individual issues.	
Teaching program: 1. Description of the work of the marketing department for companies on the market B2B (business to business): vision, mission of the department, organizational structure. 2. Evaluation of the current marketing situation of the enterprise: SWOT analiza, Marketing environment of the company. Offered products. Target market. Competition analysis. Analysis of chances and threats. 3. Defined marketing objectives: Cells in a short span of time. Cells in the long term. 4. Proposals of marketing strategies (7P formula): Chosen action in the sphere of the product, the price, distribution and promotion-mix. 5. Operational plans: Schedule of action carried out. Duties and liabilities of the staff.	
Assessment methods: activity, systematic work in the classroom, preparing reports for the issues	
Recommended reading: 1. The Industrial (Marketing) Revolution: How Technology Changes Everything for the Industrial Marketer by Jared R. Fabac (Jul 15, 2013) 2. Industrial Marketing Strategy by Frederick E. Webster Jr. (May 1, 1995) 3. The Fundamentals of Business-to-Business Sales	

Return to list of courses

Course name: **Innovation Management**	
Course code: T009	**Form of class:** Lecture, Seminar,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Hnydiuk-Stefan Anna, a.hnydiuk-stefan@po.opole.pl	
Prerequisites: English (min B1 level), Basic: Management	
Objectives of the course and learning outcomes: The focus of the course is on the analysis of key issues surrounding innovation management from the perspective of firms. By the end of the course, students will be able to understand what Innovation Management is and how it relates to business strategy and also distinguish some key characteristics of successful innovation and successful innovators. They should understand aspects of the process through which innovation occurs too. These perspectives should give insight to what influences innovation and how this varies across industries, sectors and through time. Furthermore, they will learn about the role of organizational structures and strategies in innovation. Students will develop skills in both the technical and business aspects of managing innovation.	
Teaching program: The course will include issues such as: a) discusses a number of theories of innovation which provide an historical basis for where we are now (technology waves); b) shows the role of innovation in creating competitive advantage c) presents the impact of different types of innovations on the firm, economy and society; d) describes the various sources of innovation and how to transfer innovations from their sources to points where they can be exploited; e) recognize the potential of an innovation; f) description how to developing a culture and climate of innovation; g) organizing for innovation, customers involvement in innovation; h) innovation process – what are the stages of innovation process from idea generation through to commercialization; i) explores how innovation can be financed; describes the important role government policy plays in supporting business innovation.	
Assessment methods: Course is assessed by a combination of written work and presentation.	
Recommended reading: a) Fagerberg, Jan, David C. Mowery and Richard R. Nelson (2005): The Oxford handbook of innovation. Oxford University Press. b) Tidd, Joe, John Bessant and Keith Pavitt (2009): Managing innovation, integrating technological, market and organizational change, 4. ed. John Wiley and Sons Ltd. c) von Hippel, Eric (2005): Democratizing Innovation Cambridge, MA: MIT Press. d) Rogers, Everet (2003): Diffusions of Innovations (5th Ed.), Free Press. e) Trott, P. (2008) Innovation Management and New Product Development, (3rd Ed.), Harlow: Prentice Hall. f) Smith, D. (2010) Exploring Innovation, 2nd Ed. Berkshire: McGraw-Hill. g) von Stamm, B. (2008) Managing Innovation, Design and Creativity (2nd Ed.), John Wiley	

Return to list of courses

Course name:
Logistics and Supply Chain Management

Course code: T010	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30

Language of instruction:
English

Name of the lecturer and contact information:
Kulińska Ewa, e.kulinska@po.edu.pl
Rut Joanna, j.rut@po.opole.pl

Prerequisites:
English (min B1 level),
English (the first certificate/FCE level)

Objectives of the course and learning outcomes:
The following skills and competence:
- identification of basic group elements of processes and logistic systems;
- interpretation – on a system basis – logistic relations of commercial situation of a company;
- determining and analysis of the basic logistic processes and management functions;
- understanding the principles of logistics management;
- defining of supply chain;
- identification of factors integrating companies and its systems in supply chain;
- carrying out process based analysis of supply chain;
- establishment the strategies of supply chain management;
- identification directions of a supply development chain management.

Teaching program:
1. Devoted to issues connected with the presentation of logistics, its genesis and fundamental matters referring to functional and phase segmentation of entity's logistics. Explained the basis of logistic strategy construction.
2. General system based approach and its application in a company was included.
3. A key feature of process based approach, logistic processes and their types were provided.
4. Forms of company's cooperation within supply chain, its management and factors integrating companies into supply chains were discussed.
5. The involvement into issues connected with risk management. The complexity of supply chains and logistic processes cause that the analysis without considering safety issues cannot be done.
6. Phases and elements as well as methods of risk management. Examines the tasks and place risk management logistic processes, procedure of process oriented risk management and ways of mapping risk.

Assessment methods:
Written exam and oral discussion

Recommended reading:
1. Kulińska E.: Podstawy logistyki z zarządzania łańcuchem dostaw, Oficyna Wydawnicza Politechniki Opolskiej, Opole 2009.
2. Szymonik A.: Zarządzanie zapasami i łańcuchem dostaw, Difin, Warszawa 2013
3. Szymonik A., Nowak I.: Współczesna logistyka, Difin 2018
4. Kuriata A., Kordel Z.: Logistyka i transport. Teoria oraz praktyczne zastosowania, Ce De Wu 2019
5. Waters D., Global Logistics, New directions in supply chain management, 6 th edition, The Chartered Institute of Logistics and Transport, London, Philadelphia, New Delphi 2010.

Return to list of courses

Course name: **Service Quality Management**	
Course code: T011	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Hys Katarzyna, k.hys@po.opole.pl	
Prerequisites: English (min B1 level), Basic knowledge in the scope of the management.	
Objectives of the course and learning outcomes: Understanding the being of the service quality is a purpose of classes. Getting acquainted with types of services and characteristic features of services. Distinguishing types of services and the guild of services for individual types of the market: B2B and B2C. Examining and knowing requirements of customers for services of different type. Forming the semantic profile for competence of the service staff. The evaluation and the measurement of the service quality of methods with the help chosen.	
Teaching program: 1. Defining and classifying services. 2. Designing and presenting services. 3. Services providing company – internal and outside conditioning. 4. The service contact and the buying decision process of the service. 5. Applying the mix concept of marketing in services. 6. Issues of the quality in services. 7. Problems and manners of the evaluation of the service quality. 8. Competence of employees of service companies. 9. Offer of production services – the questionnaire form and comparison. 10.Blueprinting for production services.	
Assessment methods: Exercises: active participation under the exercises, written report	

Recommended reading:
1. Baker, E. R. and Fisher, M. J., Organizing for Quality Management - Handbook of Software Quality Assurance, Artech House Inc., pp. 1-34, 2008;
2. Balog, A., Badulescu, G., Badulescu, R. and Petrescu, F. E-ServEval: a system for quality evaluation of the on-line public services, Revista Informatica Economica, Bucharest, no. 2(46), 2008;
3. Fotache, M. Probleme generale ale managementului cunostintelor, ISIS 2002, Iassy, 24-26 October, 2002;
4. Gareis, R. Professional Project Portfolio Management, IPMA World Congress, Berlin, 2002;
5. Järvinen, R. and Lehtinen, U. Services, e-Services and e-Service Innovations, Combination of Theoretical and Practical Knowledge Frontiers of e-business research, Tampere University of Technology and University of Tampere, 2004, pp. 78-89;
5. Kalle, K. Business Strategies for Information Technology Management, Idea Group Publishing, 2003;
6. Louise, E. Are we managing our knowledge?, Science, Innovation and Electronic Information Division Statistics, Canada, 2000;
7. Neagu, D. The intelligent enterprise in Knowledge Society, in proceedings of “Knowledge Technologies in Business and Management”, Iassy, June 6, 2003;
8. Pocatilu, P. IT Projects Management Metrics Informatica Economica Journal, Bucharest, no.4(44), 2007, pp. 122-125;
9. Rust, R. T. and Kannan, P. K. e-Service: New Direction in Theory and Practice, Armonk NY, 2002;
10. Scupola, A. E-Services: Definition, Characteristics and Taxonomy, Journal of Electronic Commerce in Organizations, Guest Editorial Preface, 2008;
11. Sukasame, N. E-Service Quality: A Paradigm for Competitive Success of E-Commerce Entrepreneurs, The Ninth Pacific Asia Conference on Information Systems (PACIS-2005), 2005;
12. Whitman, M. E. and Woszczynski, A. B. The Handbook of Information Systems Research, Idea Group Publishing, 2004;
13. Quality Management Principles, [Online], Available: http://www.iso.org/iso/iso_catalogue/management_standards/iso_9000_iso_14000/qmp.htm.

Return to list of courses

Course name: **Marketing**	
Course code: T012	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Hys Katarzyna, k.hys@po.opole.pl	
Prerequisites: English (min B1 level), Basic knowledge in the scope of the management.	
Objectives of the course and learning outcomes: Acquainting students with bases of marketing, including cells, tasks, functions, strategies, instruments and essential methods are a purpose of the object. Exploiting the wisdom in practice is significant - this process is being carried out on exercise classes as part of individual issues.	
Teaching program: 1. Description of the work of the marketing department: vision, mission of the department, organizational structure. 2. EVALUATION OF THE CURRENT MARKETING SITUATION OF THE ENTERPRISE: Marketing environment of the company. Offered products. Target market. Competition analysis. Analysis of chances and threats. 3. DEFINED MARKETING OBJECTIVES: Cells in a short span of time. Cells in the long term. 4. PROPOSALS OF MARKETING STRATEGIES: Chosen action in the sphere of the product, the price, distribution and promocji-mix. 5. OPERATIONAL PLANS: Schedule of action carried out. Duties and liabilities of the staff.	
Assessment methods: exercises: active participation under the exercises, written report.	
Recommended reading: 1. Hoyer, W.D. and MacInnis, D.J. (2001) Consumer Behaviour, 2nd Edition, USA: Houghton Mifflin Company; 2. Baker, M. (2000) Marketing Management and Strategy, 3rd edition, Macmillan Business; 3. Booms, B.H. and Bitner, M.J. (1981), Marketing strategies and organisation structures for service firms, in Marketing of Services, J. Donnelly and W.R. George (eds), American Marketing Association; 4. Davies, M. (1998) Understanding Marketing, 1st edition. Prentice Hall; 5. Fill, C (2002) Marketing Communications, Contexts, strategies and applications, Prentice Hall; 6. Kotler, P, Armstrong, G, Saunders, J and Wong, V, (2001), Principles of Marketing: Third European Edition, Prentice Hall, Harlow; 7. Kotler, P. and Armstrong, G. (1997) Marketing An Introduction. Fourth Edition. New Jersey. Prentince Hall International; 8. Kotler, P., Armstrong, G., Saunders, J. and Wong, V. (1999) Principles of Marketing, 2nd Edition, New Jersey: Prentice Hall; 9. Lauterborn, R.(1990), New marketing litany:4Ps passe; 4Cs take over, Advertising Age, Oct. 1:26; 10. Lovelock (2001) Services Marketing, people, technology, strategy, Prentice Hall; 11. McCarthy, J. (1975), Basic Marketing: a managerial approach, Homewood, IL; 12. McDonald, M. (2001) Marketing Plans. How to prepare them, how to use the. 4th edition, Butterworth Heinenamm; 13. Peter, J.P. and Olson, J.J. (1996) Consumer Behaviour and Marketing Strategy, USA: Irwin.	

Return to list of courses

Course name: **Mathematics I**	
Course code: T014	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 4	**Number of hours per semester:** 60
Language of instruction: English	
Name of the lecturer and contact information: Ścięgosz Hanna, h.sciegosz@po.opole.pl	
Prerequisites: English (min B1 level), Fundamental knowledge of mathematics, elementary functions, some experience with mathematical language and proofs.	
Objectives of the course and learning outcomes: The goal of this lecture comes to know the algebraic notations and to apply them to solve some technical problems. Introducing of students to differential and integral calculus of real functions of one variable and providing the background for more advanced mathematical courses.	
Teaching program: 1. Mappings and their properties; 2. Sequences of numbers and limits of sequences; 3. Elementary functions; 4. Limits of one variable functions, continuity; 5. Differentiation of one variable functions; 6. Applications of the derivative to geometry and physics; 7. Graphing of functions using first and second derivatives; 8. Definition of the indefinite integral; 9. Integration by parts; 10. Integration by substitution; 11. Integration of rational functions; 12. Definition of the Riemann integral; 13. Applications of the definite integral; 14. Definition of the improper integral, tests for convergence; 15. Length of a curve, lateral area and volume of surface of revolution.	
Assessment methods: Written and oral assessment, individual elaborate, three written tests during semester.	
Recommended reading: 1. E. Zakon, Mathematical Analysis I, The Trillia Group, 2004; 2. B. S. Schroder, Mathematical Analysis: A Concise Introduction, JohnWiley, 2008; 3. G.M. Fichtenholz, Course in the Differential and Integral Calculus vol. I, II, III, Nauka, Moscow, 1969. 4. B. Sikora, E. Łobos, A First Course in Calculus, Wydawnictwo Politechniki Śląskiej, 2007	

Return to list of courses

Course name: **Mathematics II**	
Course code: T015	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Ścięgosz Hanna, h.sciegosz@po.opole.pl	
Prerequisites: English (min B1 level), Fundamental knowledge of differential and integral calculus of real functions of one variable (Calculus I course), some experience with mathematical language and proofs.	
Objectives of the course and learning outcomes: Introducing of students to polynomial and trigonometric expansions of functions of one variable and to differential calculus of functions of several variables. Providing the background for more advanced mathematical courses.	
Teaching program: 1. Infinite series of numbers; 2. Positive series, convergence criteria, relative and absolute convergence; 3. Sequences and series of functions, Weierstrass majorant criterion; 4. Power series, domain of convergence; 5. Fourier real and complex series, applications; 6. Basic properties of n-dimensional Euclidean space; 7. Limits of several variable functions, continuity; 8. Partial derivatives, gradient, total differential, directional derivative, tangent plane; 9. Higher order derivatives, Hessian matrix; 10. Differential calculus for vector valued functions, Jacobian matrix; 11. Extreme of several variable function and its applications; 12. Relative extrema.	
Assessment methods: Written and oral assessment, individual elaborate, two written tests during semester, written final exam.	
Recommended reading: 1. E. Zakon, Mathematical Analysis I and II, The Trillia Group, 2004; 2. B. S. Schroder, Mathematical Analysis: A Concise Introduction, JohnWiley, 2008; 3. G.M. Fichtenholz, Course in the Differential and Integral Calculus vol. I, II, III, Nauka, Moscow, 1969. 4. B. Sikora, E. Łobos, A First Course in Calculus, Wydawnictwo Politechniki Śląskiej, 2007	

Return to list of courses

Course name: **Mathematics III**	
Course code: T016	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Ścięgosz Hanna, h.sciegosz@po.opole.pl	
Prerequisites: English (min B1 level), Fundamental knowledge of differential and integral calculus of one and multivariable real functions (Mathematics I and Mathematics II courses), ability to calculate derivatives and integrals quickly, knowledge of the shape of the second order surfaces.	
Objectives of the course and learning outcomes: Introducing of students to integral calculus of functions of several variables.	
Teaching program: 1. Definition and main properties of a double integral; 2. Change of a double integral to an iterate integral; 3. Change of variables in a double integral; 4. Applications of a double integral to geometry and physics; 5. Definition and main properties of a triple integral; 6. Change of a triple integral to an iterate integral; 7. Change of variables in a triple integral; 8. Applications of a triple integral to geometry and physics; 9. Parametric form of curves in 3-D space; 10. Line integral of a scalar fields, definition, properties and change to definite integral; 11. Line integral of a vector fields, definition, properties and change to definite integral; 12. Potential of vector field, path independence; 13. Line integral of a vector field in 2-D space, Green's theorem; 14. Parametric form of surfaces; 15. Surface integral of a scalar fields, definition, properties and change to double integral; 16. Surface integral of a vector fields, definition, properties and change to double integral; 17. Rotation and divergence, Gauss-Ostrogradsy's and Stokes' theorems and their applications.	
Assessment methods: Written and oral assessment, individual elaborate, written final exam.	
Recommended reading: 1. E. Zakon, Mathematical Analysis I and II, The Trillia Group, 2004; 2. B. S. Schroder, Mathematical Analysis: A Concise Introduction, John Wiley, 2008; 3. G.M. Fichtenholz, Course in the Differential and Integral Calculus vol. I, II, III, Nauka, Moscow, 1969; 4. B. Sikora, E. Łobos, A First Course in Calculus, Wydawnictwo Politechniki Śląskiej, 2007.	

Return to list of courses

Course name: **Project Management (at Faculty of Production Engineering and Logistics)**	
Course code: T019	**Form of class:** Lecture, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Łapuńka Iwona, i.lapunka@po.opole.pl	
Prerequisites: English (min B1 level), Basic knowledge in the scope of the Management, Economics, Finance and Accounting, Operations Research	
Objectives of the course and learning outcomes: The aim of this course is to acquaint students with the theoretical foundations of project management and elements of practical knowledge needed to participate in a project team or conduct of individual projects (subprojects). Students will acquire and establish knowledge about methods of planning, estimating and scheduling projects, and computer software available in this area.	
Teaching program: 1. The Project Management Framework: What is a project?, What is project management?, Relationship to other management disciplines related endeavors, The project management context, Project phases and the project life cycle, Project stakeholders, Organizational influences, Key general management skills, Socioeconomic influences. 2. Project Management Processes: Process groups, Process interactions, Customizing process interactions. 3. The Project Management Knowledge Areas: Project integration management, Project plan development, Project plan execution, Overall change control. 4. Project Scope Management: Initiation, Scope planning, Scope definition, Scope verification, Scope change control. 5. Project Time Management: Activity definition, Activity sequencing, Activity duration estimating, Schedule development, Schedule control. 6. Project Cost Management: Resource planning, Cost estimating, Cost budgeting, Cost control. 7. Project Quality Management: Quality planning, Quality assurance, Quality control. 8. Project Human Resource Management: Organizational planning, Staff acquisition, Team development. 9. Project Communications Management: Communications planning, Information distribution, Performance reporting, Administrative closure. 10. Project Risk Management: Risk identification, Risk quantification, Risk response development, Risk response control. 11. Project Procurement Management: Procurement planning, Solicitation planning, Solicitation, Source selection, Contract administration, Contract close-out.	
Assessment methods: Lecture - oral examination; active participation in the project; project completion of individual assignments, written report.	
Recommended reading: 1. Adam E.E., Ebert R.J., Productions and operations management, Prentice Hall, New Jersey 2009. 2. A guide to the project management body of knowledge. Fourth Edition, PMI, USA 2008. 3. Goldratt E. M., Critical chain. Great Barrington, MA, North River Press 1997. 4. Kerzner H., Advanced project management: best practices on implementation, John Wiley	

Return to list of courses

Course name: **Quality Management (at Faculty of Production Engineering and Logistics)**	
Course code: T020	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Hys Katarzyna, k.hys@po.opole.pl Kucińska-Landwójtowicz Aneta, a.kucinska@po.opole.pl	
Prerequisites: English (min B1 level), ---	
Objectives of the course and learning outcomes: Purpose of the exercise: Methods supporting the quality management in the production in real conditions (in the given enterprise).	
Teaching program: Process approach in quality management systems within an organization. Assumptions for process approach covered by ISO 9001. Definitions related to processes. Human, equipment and material resources management. Processes distribution within an organization. Methods of process determination within an organization. Documentation of the process-based quality management system.	
Assessment methods: activity, systematic work in the classroom, preparing reports for the issues.	
Recommended reading: 1. ISO 9001; Quality management systems - requirements. 2. Quality Associates International's History of FMEA 3. E. Fadlovich, Performing Failure Mode and Effect Analysis [1] 4. http://www.asq.org/learn-about-quality/process-analysis-tools/overview/fmea.html 5. Kmenta, Steven; Koshuke Ishii (November 2004). "Scenario-Based Failure Modes and Effects Analysis Using Expected Cost". Journal of Mechanical Design 126 (6): 1027. 6. HARVARD BUSINESS REVIEW, The House of Quality by John R. Hauser and Don Clausing, May-June 1988 7. Maisel, L.S., “Performance measurement: the balanced scorecard approach”, Journal of Cost Management, Vol. 6 No. 2, 1992, pp. 47-52. 8. Cobbold, I. and Lawrie, G. (2002a). “The Development of the Balanced Scorecard as a Strategic Management Tool”. Performance Measurement Association 2002 9. Kaplan R.S. and Norton D.P. (2000). The Strategy Focused Organization, HBS Press, USA.	

Return to list of courses

Course name: **Quality Management of Production**	
Course code: T021	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Hys Katarzyna, k.hys@po.opole.pl Kucińska-Landwójtowicz Aneta, a.kucinska@po.opole.pl	
Prerequisites: English (min B1 level), Basic knowledge in the scope of the management	
Objectives of the course and learning outcomes: Purpose of the exercise: Methods supporting the quality management in the production in real conditions (in the given enterprise).	
Teaching program: Applying chosen methods of estimation of the product quality: • Quality Function Deployment (QFD), • Failure mode and effects analysis (FMEA), • Complaint resolution (procedure), • Strategic scorecard (BSC), • Ranking of Suppliers according to beloveds of criteria, • Audits (list of test questions, check list).	
Assessment methods: activity, systematic work in the classroom, preparing reports for the issues	
Recommended reading: 1. Quality Associates International's History of FMEA; 2. E. Fadlovich, Performing Failure Mode and Effect Analysis [1]; 3. http://www.asq.org/learn-about-quality/process-analysis-tools/overview/fmea.html; 4. Kmenta, Steven; Koshuke Ishii (November 2004). "Scenario-Based Failure Modes and Effects Analysis Using Expected Cost". Journal of Mechanical Design 126 (6): 1027; 5. HARVARD BUSINESS REVIEW, The House of Quality by John R. Hauser and Don Clausing, May-June 1988 6. QFD FAQ: Frequently Asked Questions about QFD 7. http://www.webducate.net/qfd/ 8. QFD Online - Free House of Quality (QFD) Templates for Excel 9. "What is QFD?" - White paper explaining what QFD is and how to use it. 10. 2GC Limited (2009), "2GC Balanced Scorecard Usage Survey 2009", “FAQ Answer: What is the Balanced Scorecard?”. 11. Art Schneiderman, "The First Balanced Scorecard" 12. "The Balanced Scorecard - Measures that Drive Performance", Harvard Business Review, Feb. 1992 13. Maisel, L.S., “Performance measurement: the balanced scorecard approach”, Journal of Cost Management, Vol. 6 No. 2, 1992, pp. 47-52. 14. Cobbold, I. and Lawrie, G. (2002a). “The Development of the Balanced Scorecard as a Strategic Management Tool”. Performance Measurement Association 2002 15. Kaplan R.S. and Norton D.P. (2000). The Strategy Focused Organization, HBS Press, USA.	

Return to list of courses

Course name: **Management of project teams**	
Course code: T023	**Form of class:** Lecture, Seminar,
Level of study: postgraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Jagoda-Sobalak Dominika, d.jagoda-sobalak@po.edu.pl	
Prerequisites: English (min B1 level), Basic knowledge of management theory, project management, human resources management.	
Objectives of the course and learning outcomes: The aim of this course is to give the students a deeper introduction to the theory and practice of project team management. Students learn how to motivate, delegate, resolve conflicts, boost creativity of team members.	
Teaching program: 1. Staff acquisition, competence of team members (for example test Belbin); 2. Planning and organization of team work; 3. Leadership skills (Communication, Motivation, Delegating, Positivity, Trustworthiness, Creativity, Feedback, Responsibility, Commitment, Flexibility); 4. Communication in the project team; 5. Motivation in the project team; 6. Control of the project team; 7. Dysfunctions of the project team; 8. Conflict management in the project team; 9. Creative unit, creative teams and creative organization.	
Assessment methods: Lecture – oral examination, seminar - practical classes assessment.	
Recommended reading: 1. Kliem R.S, PMP.: Effective Communications for Project Management. CRC Press, 2007. 2. Young T.L.: Successful Project Management. Kogan Page Publishers, 2016. 3. Lewis J., Wong L.: Accelerated Project Management. McGraw Hill Professional, 2004. 4. Field M, Keller L.S.: Project Management. Cengage Learning EMEA, 1998.	

Return to list of courses

Course name: **Control Theory**	
Course code: T024	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Pączko Dariusz, d.paczko@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level), Linear Algebra, Mathematical Analysis, Differential Equations	
Objectives of the course and learning outcomes: The aim of the course is to derive state equations for simple circuits described by differential equations. The controllability and stability conditions of linear systems will be given. The issue of optimal control will be examined.	
Teaching program: Systems of linear differential equations, controllability and observability, Kalman decomposition, stability and stabilizability, Routh theorem, systems with constraints, minimalization of quadratic criteria, Riccati equation, the maximum principle.	
Assessment methods: Written and oral assessment, two written tests during semester.	
Recommended reading: 1. Mathematical Control Theory: An Introduction, Jerzy Zabczyk, Birkhauser, 1992; 2. Mathematical Control Theory: Deterministic Finite Dimensional Systems, Eduardo D. Sontag, Springer, 1998; 3. Mathematical Control Theory, John B. Baillieul, J. C. Willem, Springer, 1998.	

Return to list of courses

Course name: **Operational Research**	
Course code: T026	**Form of class:** Lecture, Group tutorial, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Deptuła Adam, a.deptula@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level), Basic knowledge in the scope of the Management, Economics, Applications of Mathematics and Operations Research.	
Objectives of the course and learning outcomes: Knowledge in the field of linear programming and methods of supporting optimal decision making, basics of linear programming, principles of the simplex algorithm, knowledge of the construction of dual models, methods of sensitivity analysis of the optimal solution and the basis of comprehensive analysis of the optima solution.	
Teaching program: 1. The essence and genesis of operational research. Subject and methodology of operational research. Introduction to the problems of mathematical programming. 2. Linear programming. Presentation of selected decision problems in the form of linear programming tasks. 3. Organizational matters. Principles of linear programming. Construction of mathematical models of linear programming tasks. Goal function, decision variables, inequality constraints. 4. Solving sample problems of linear programming - the use of a computer program: SOLVER module EXCEL spreadsheet. 5. Solving sample problems of linear programming - using the WinQSB computer program. 6. Dual symplex method - use of a computer program: SLOVER module of EXCEL spreadsheet. 7. Transport problem. Open and closed transport issue. The transport algorithm. 8. Solving sample problems with transport - production and transport-storage issues. 9. Dependency networks - deterministic (CPM, PERT) and stochastic (GERT). Resource Optimization in dependency networks. The traveling salesman problem. 10. Practical analysis of mass service systems. Selected characteristics of mass service systems – use of a computer program: SOLVER module of EXCEL spreadsheet and WinQSB program.	
Assessment methods: Evaluation of individual presentations and also attention, laboratory report.	
Recommended reading: 1. Bretthauer KM and Côté MJ (1998) A model for planning resource requirements in health care organizations. Decision Sciences 29(1), pp. 243–270. 2. McNamee, P., J. Celona. 1990. Decision Analysis with Supertree, 2nd Edition. Scientific Press, South San Francisco, C. 3. Matheson, D., J. E. Matheson. 1999. Outside-in strategic modeling. Interfaces 29(6), pp. 29−41.	

Return to list of courses

Course name: **Statistics**	
Course code: T027	**Form of class:** Lecture, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Koziarska Anna, a.koziarska@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level), basic knowledge of mathematical analysis (including differentiation and integration of one variable functions) and algebra.	
Objectives of the course and learning outcomes: To learn the basic ideas of probability theory and its applications. To learn and understand the methods of descriptive statistics and the methods of mathematical statistics and to acquire the ability to apply them to practical problems. To become familiar with the application of STATISTICA (computer program).	
Teaching program: Descriptive statistics (empirical distributions of continuous and discrete statistical characteristics, measures of central tendency: mode, median , mean, measures of dispersion: range, variance, standard deviation, measures of shape: kurtosis, skewness); basics of probability theory (basic concept and definitions); random variables (discrete and continuous); discrete distributions; continuous distributions; important examples of distributions (binomial distribution, Poisson distribution, normal distribution); hypothesis testing (basic concepts and examples: normal model tests, two-sample normal model tests, non-parametric tests); basics of regression and correlation (linear correlation and regression as an example).	
Assessment methods: Several self-solving tasks using STATISTICA.	
Recommended reading: 1) D. C. Montgomery, G. C. Runger: Applied Statistics and Probability for Engineers, John Wiley, New York, 2003	

Return to list of courses

Course name: **Investment Project Management**	
Course code: T028	**Form of class:** Lecture, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Marek-Kołodziej Katarzyna, k.marek-kolodziej@po.opole.pl	
Prerequisites: English (min B1 level), Basic knowledge in the scope of the Management, Economics, Finance and Accounting.	
Objectives of the course and learning outcomes: The aim of the course is to acquaint students with the typology of investment projects. Learning the methods and acquiring the ability to formulate and evaluate investment projects. Acquainting with the basic principles and tools for managing investment projects.	
Teaching program: 1. Definition and features of an investment project. Investment classification. 2. Sources of financing for investment projects. Cost of capital invested in implementation investment. 3. Planning and implementation of an investment project - overview of general management phases. 4. Pre-investment phase - overview of the investment possibility study, pre-implementation and feasibility. 5. Methods of assessing the economic effectiveness of an investment project. 6. Methods of risk assessment of an investment project. 7. Schedule for the implementation of investment projects. 8. Investment implementation phase. 9. Phase of completion and exploitation of the investment - analysis of the effectiveness and efficiency of implementation investment project.	
Assessment methods: Lecture – oral examination; active participation in the project; project completion of individual assignments.	
Recommended reading: 1. Kurowski L., Sussman D., Investment Project Design, A Guide to Financial and Economic Analysis with, Wiley, 2021. 2. Project Management Instiute, A guide to the project management body of knowledge. Seventh Edition, PMI, USA 2021. 3. Lewis J.P., Project Planning, Scheduling, and Control: The Ultimate Hands-On Guide to Bringing Projects in On Time and On Budget, MCGRAW-HILL Higher Education, New Jork 2010. 4. Yescombe E. R., Principles of Project Finance, Elsevier Books, 2013. 5. Kerzner H., Using the Project Management Maturity Model: Strategic Planning for Project Management, Wiley John Sons, 2019. 6. Project Management Instiute, The Standard for Portfolio Management, PMI, 2017. 7. Zhang L.H., Repetitive Project Scheduling: Theory and Methods, Elsevier Science	

Return to list of courses

Course name: **Methods and Techniques of Project Scheduling**	
Course code: T029	**Form of class:** Lecture, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Marek-Kołodziej Katarzyna, k.marek-kolodziej@po.opole.pl	
Prerequisites: English (min B1 level), Basic knowledge in the scope of the Management, Project Management, Economics, Finance and Accounting, Operations Research.	
Objectives of the course and learning outcomes: The aim of the course is to acquaint students with advanced solutions in terms of project scheduling. Students will develop skills in applying project scheduling methods and techniques.	
Teaching program: 1. Characteristics of the projects. Project structure: activities, resources, relationships, milestones. 2. Why schedule a project? Methods and techniques used at the stage of initiation and defining the project. 3. Work Breakdown Structure. Create action lists and milestone lists. Declaration of the scope of the project. 4. Scheduling activities. Establishing the relationship between activities. Establishing advance notice and delays. 5. Sequence diagram method, arrow diagram method, templates network schedules, determining dependencies, applying advance and delay. 6. Planning resources in the project. 7. Costs and financial resources in the project. 8. Project risk management. 9. Setting schedules. Critical path. Gantt charts and schedules calendar. 10. Schedule optimization problem. Shortening project durations. 11. Project portfolio scheduling.	
Assessment methods: Lecture – oral examination; active participation in the project; project completion of individual assignments, written report.	
Recommended reading: 1. Project Management Instiute, A guide to the project management body of knowledge. Seventh Edition, PMI, USA 2021. 2. Lewis J.P., Project Planning, Scheduling, and Control: The Ultimate Hands-On Guide to Bringing Projects in On Time and On Budget, MCGRAW-HILL Higher Education, New Jork 2010. 3. Goldratt E. M., Critical chain. Great Barrington, MA, North River Press 1997. 4. Kerzner H., Advanced project management: best practices on implementation, John Wiley, 2004. 5. Zhang L.H., Repetitive Project Scheduling: Theory and Methods, Elsevier Science	

Return to list of courses

Course name: **Numerical Methods**	
Course code: T030	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Pączko Dariusz, d.paczko@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level), Linear Algebra, Mathematical Analysis, Differential Equations	
Objectives of the course and learning outcomes: Many practical applications of computers require calculations on real or complex numbers. In this course we present methods for the numerical solution of basic mathematical problems encountered in applications.	
Teaching program: Floating point arithmetic. Problem conditioning, numerical correctness of the algorithm. Nonlinear equations. Selected problems of linear algebra: systems of linear equations, linear least squares problem, eigenproblem. Interpolation and approximation: polynomial, spline, trigonometric, Fast Fourier Transform. Integration and differentiation.	
Assessment methods: Written and oral assessment, one written tests during term.	
Recommended reading: 1. Dautray R.: Mathematical Analysis and Numerical Methods for Science and Technology. Springer Verlag, Berlin, 1990. 2. Kincaid, David R. and Ward Cheney. Numerical Analysis: Mathematics of Scientific Computing, 1991. 3. Björck, Åke, Germund Dahlquist and Ned Anderson. Numerical methods, 1974.	

Return to list of courses

Course name: **Advanced Mathematics**	
Course code: T031	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Pączko Dariusz, d.paczko@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level), Linear Algebra, Mathematical Analysis, Differential Equations	
Objectives of the course and learning outcomes: The course aims to familiarize students with the basic types of partial differential equations and integral equations	
Teaching program: • General solution and complete integral, characteristic surfaces for equations of first order • Partial differential equations of the second order for functions of two variables, method of characteristics, classification, canonical form, hyperbolic, elliptic and parabolic type equations. • Issues in mathematical physics - Fourier method of separation of variables. • Volterra integral equation. Fredholm integral equation. Integro-differential equation. Fredholm alternative.	
Assessment methods: Written and oral assessment, one written tests during term.	
Recommended reading: 1. Jost, J. (2002), Partial Differential Equations, New York: Springer-Verlag, 2. Evans, L. C. (1998), Partial Differential Equations, Providence: American Mathematical Society 3. Andrei D. Polyanin and Alexander V. Manzhirov Handbook of Integral Equations. CRC Press, Boca Raton, 1998. 4. Corduneanu, C. Integral Equations and Applications. Cambridge, England: Cambridge University Press, 1991. • Polyanin, A. D. and Manzhirov, A. V. Handbook of Integral Equations. Boca Raton, FL: CRC Press, 1998.	

Return to list of courses

Course name: **Application of the Mathematica Package**	
Course code: T032	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Pączko Dariusz, d.paczko@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level), Linear Algebra, Mathematical Analysis, Differential Equations	
Objectives of the course and learning outcomes: The course demonstrate how Mathematica can be used to solve problems in science, engineering and economics.	
Teaching program: An introduction to Mathematica. The Mathematica language. Lists. Patterns and rules. Functional programming. Procedural programming. Recursion. Numerics. Strings. Graphics and visualization. Dynamic expressions. Applications and packages.	
Assessment methods: Selected problems solving.	
Recommended reading: 1. Stephen Wolfram, The Mathematica Book, Wolfram Media 2. online https://www.wolfram.com/mathematica/resources/	

Return to list of courses

Course name: **Microeconomics**	
Course code: T033	**Form of class:** Seminar,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Deptuła Anna, an.deptula@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level)	
Objectives of the course and learning outcomes: 1. Basic concepts in the field of microeconomics. 2. Economic aspects of the functioning of enterprises in the economy. 3. Behaviour of households and enterprises on the marketplace.	
Teaching program: This course begins with an introduction to supply and demand and the basic forces that determine an equilibrium in a market economy. Next, students get to know consumer behavior and analyzing basic decisions of company (cost of production). After completing this course, students should have developed a range of skills enabling them to understand economic concepts and use those concepts to analyze specific questions. The course will include issues such as: 1. Basic economic concepts. 2. Demand, supply, and equilibrium. 3. Measurement of elasticities. 4. Consumer demand theory. 5. Theory of production. 6. Costs of production. 7. Forms of the market.	
Assessment methods: Preparing report for the selected problems.	
Recommended reading: 1. Microeconomics, Begg D., Fischer S., Dornbusch R.; McGraw-Hill Education, 2005. 2. Eaton, B. Curtis; Eaton, Diane F.; and Douglas W. Allen. Microeconomics. Prentice Hall, 5th Edition: 2002. 3. Frank, Robert H.; Microeconomics and Behavior. McGraw-Hill/Irwin, 6th Edition: 2006. 4. Colander, David. Microeconomics. McGraw-Hill Paperback, 7th Edition: 2008. 5. Varian, Hal R. Microeconomic Analysis. W. W. Norton	

Return to list of courses

Course name: **Basic in Jurisprudence**	
Course available with minimum number of 4 participants.	
Course code: AL010	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Edaich Said, s.edaich@po.opole.pl Zamelski Piotr, p.zamelski@po.opole.pl	
Prerequisites: English (min B1 level), -	
Objectives of the course and learning outcomes: The course aims to give students theoretical knowledge sufficient to begin superior studies or to begin to professional life. The goal is to develop critical thinking and curiosity of students, enabling them to approach the rules and to analyze them with the basic knowledge required.	
Teaching program: Notion of law (and society). The law as a set of objective rules (objective law) Real Right and Personal Right The Characteristics of the rule of law The rule of law is imperative The rule of law is general The rule of law is permanent The law has a social purpose The fields of law a - Private law b - The public law c - Mixed law d - The private international Law e - The public international Law The Sources of Law a - Direct Sources Legislation: concept of legislation, legislation and Regulation Binding force of law Birth and death of the law The repeal of the law b - The Custom Development of custom Binding of custom c-The Jurisprudence d-The Doctrine The judicial organization The judiciary courts The courts of first instance: Civil court, penal court. The higher court: the court of appeal The Court of Cassation The Administrative Jurisdictions The Council of State Administrative tribunals The administrative courts of appeal Jurisdictions of External order The Disputes Tribunal The Constitutional Council The European Courts The Court of Justice of European Communities The European Court of Human Rights The Domain of the application of the rule of law In Space In Time.	
Assessment methods: Lecture Activity performed using audiovisual techniques, supplemented by case studies, group work and discussions with students and encouraging them actively to engage in problem solving.	
Recommended reading: -	

Return to list of courses

Course name: **Administrative science**	
Course code: AL012	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Edaich Said, s.edaich@po.opole.pl	
Prerequisites: English (min B1 level), ---	
Objectives of the course and learning outcomes: The main objective of the course is to introduce to students basic and more detailed topics related to public administration.	
Teaching program: 1) Public administration: meaning and importance, 2) Nature and typology of public administration organisation, 3) Theory of administration, 4) Administrative management, 5) Structure of administrative organisation, 6) Development administration, 7) Public policy, 8) Bureaucratic theory, 9) Neo-classical theory (Human Relations), 10) Behavioural theory, 11) Decision-Making theory, 12) Hierarchy or scalar principle, 13) Centralisation and decentralisation of public administration, 14) Accountability and Control,	
Assessment methods: Students are expected to attend the classes and to take on active part in seminar discussions. Students will be asked to prepare one brief essay (5000 words). In order to prepare the essay students may be required to do some individual research.	
Recommended reading: • P. Sahni, E. Vayunandan, Administrative Theory, New Delhi 2010, • B. Guy Peters, J. Pierre (ed.), Handbook of Public Administration, London 2007,	

Return to list of courses

Course name: **Constitutional Law**	
Course code: AL013	**Form of class:** Lecture, Group tutorial, Seminar,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Zamelski Piotr, p.zamelski@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level), Basic knowledge of specific legal terminology	
Objectives of the course and learning outcomes: Basic knowledge of the constitutional system of state organs in Poland as well as the basic terms of theory of constitution	
Teaching program: Teaching program: 1. The concept of constitution 2. Constitutionalism 3. Polish constitutions of 1921, 1935, 1952, 1997. Comparison 4. Constitutional rules and constitutional principles 5. The principle of division of power 6. The principles of the electoral law in Poland 7. Sejm and Senat. The main functions and internal structure 8. The sources of universally binding law of Poland 9. The President of Poland. The main functions and responsibility 10. The Council of Ministers – role, structure and competence. The Prime Minister 11. The constitutional principles of judicature and its structures 12 The Constitutional Tribunal. The constitutional review 13. Civil rights and liberties. Comparison on The Convention for the Protection of Human Rights and Fundamental Freedoms and the Constitution of Poland 14. Limitation of the rights and freedoms under The Convention for the Protection of Human Rights and Fundamental Freedoms and the Constitution of Poland 15.Discussion	
Assessment methods: Constant evaluation of student’s work. Final test in the end of semester. Duration and test date is given on the first class	
Recommended reading: Prokop K., Polish Constitutional Law, Białystok 2011. Banaszak B., Outline of Polish Constitutional Law, Wrocław 2005	

Return to list of courses

Course name:
Fundamentals of Labour Law and Rights of Officials

Course available with minimum number of 4 participants.

Course code: AL020	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30

Language of instruction:
English

Name of the lecturer and contact information:
Edaich Said, s.edaich@po.opole.pl

Prerequisites:
English (min B1 level),
-

Objectives of the course and learning outcomes:
The course aims to give students theoretical knowledge sufficient to begin superior studies or to begin to professional life. The goal is to develop critical thinking and curiosity of students, enabling them to approach the rules and to analyze them with the basic knowledge required.

Teaching program:
A - History and concepts of labor law
-Definition of labor law
-Collective labor law
-Individual labor law
-Principles of labor law
B - International Organizations:
- The International Labor Organization
- International conference of Labors
C - Institutions of labor law:
- The employer
- Employee
- Work
- Health and safety in labor place
- The Syndicate
D - Contracts of employment:
- Parties
- The subject contract.
- Rights and responsibilities.
- Conditions of employment.
- Redemption of the employment contract.
E - Safety in the Workplace:
- Employee Insurance
- European Agency for Safety and Health at Work (EU-OSHA)
- The European Risk Observatory
- Anti-discrimination
- The list of acts of anti-discrimination
F - The organization of labor market (in a global system).
G- Civil service law
- The concept of civil service law and public administration
- Sources of civil service law
- The concept of an official (civil servant);
- Legal nature of the official position
- Rights and duties of Official
- The Europeanization of civil service law
- The employment

Assessment methods: Lecture Activity performed using audiovisual techniques, supplemented by case studies, group work and discussions with students and encouraging them actively to engage in problem solving
Recommended reading: 1) Civil service systems in Western Europe. A. J. G. M. Bekke, Frits M. Meer, - Editor Edward Elgar Publishing, 2000. 2) The New Public Service: Serving Not Steering. Janet Vinzant Denhardt, Robert B. Denhardt, - Editor M.E. Sharpe, 2007. 3) Modernizing Civil Services. Tony Butcher, Andrew Massey, - Editor Edward Elgar Publishing, 2003. 4) Public Management Reform: A Comparative. Christopher Pollitt, Geert Bouckaert, 2 edition – Editor Oxford University Press, 2004. 5) Labour Law and Labour Market Regulation: Essays on the Construction, Constitution and Regulation of Labour Markets and Work Relationships. 6) The Law of Work. Rosemary Owens, Joellen Riley, Jill Murray, 2 edition- Editor Oxford University Press, 2011. 7) The Future Of Labour Law. Catherine Barnard, Simon F. Deakin, B. A. Hepple, Gillian S. Morris, - Editor Hart Publishing, 2004. 8) Labour Law. Simon F. Deakin, Gillian S. Morris, 4 edition, - Editor Hart Pub., 2005.

Return to list of courses

Course name: **International Law**	
Course available with minimum number of 4 participants.	
Course code: DAL005	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Edaich Said, s.edaich@po.opole.pl	
Prerequisites: English (min B1 level), -	
Objectives of the course and learning outcomes: The course aims to give students theoretical knowledge sufficient to begin superior studies or to begin to professional life. The goal is to develop critical thinking and curiosity of students, enabling them to approach the rules and to analyze them with the basic knowledge required.	

Teaching program:
A - Introduction, and Approaches to International Law:
What is International Law?
International (Community) Order.
International law definition
International Law and Domestic law.
Sources of international law
(international treaties, custom, and general principles of law).
B - Topics in International Law:
 Human Rights Law.
 International Environmental Law.
 International Criminal Law.
 International Economic Law.
C - Principles of International Law.
the Concepts of Fundamental Principles of International Law.
a-principle of national sovereignty. b-the principle of self-determination of peoples.
c-the fulfillment of international obligations.
D - Subjects of International Law
a- the State
 legal elements of the State
 classification of States
 formation of State
 recognition of states
 fall of states
 succession of States
b- Other Subjects of International Law.
 autonomous Territories
 community insurgent
c- International Organizations
 classification of international organizations.
 statutes of international organizations
 membership of international organizations
 vote and resolutions of international organizations
E - International Agreements
 concepts and classification of international agreements
 conclusion of international agreements
 duration and implementation of international agreements
 invalidity, and expiration of international agreements
F - International Disputes
 concepts and classification of international disputes
 diplomatic means of settling international disputes
 The judicial means of settling international disputes
G - Armed Conflict
 concepts and classification of armed conflicts
 Prevention of armed conflict
 regime of armed conflict
End of armed conflict

Assessment methods:
Lecture Activity performed using audiovisual techniques, supplemented by case studies, group work and discussions with students and encouraging them actively to engage in problem solving

Recommended reading:
1) International Law
Malcolm Nathan Shaw. 5 edition, Editor Cambridge University Press, 2003.
2) Modern Introduction to International Law, (International politics/Public international law).
Peter Malanczuk, Michael Barton Akehurst Redactors Peter Malanczuk, Michael Barton Akehurst, 7 edition, Editor Routledge, 1997.
3) International law. AutorAlan Vaughan Lowe, Clarendon law series. Editor Oxford University Press, 2007.
4) International law.
Antonio Cassese. Editor Oxford University Press, 2001.
5) The Settlement of Disputes in International Law: Institutions and Procedures.
John Collier, Vaughan Lowe. Editor Oxford University Press, 2000.
6) Principles of public international law.
Ian Brownlie. 2 ed, Editor Clarendon Press, 1973.
7) International law
Valerie Epps. 2 edition, Editor Carolina Academic Press, 2001.
8) International Law: Examples

Return to list of courses

Course name: **System of local government**	
Course code: DAL030	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Edaich Said, s.edaich@po.opole.pl	
Prerequisites: English (min B1 level), ---	
Objectives of the course and learning outcomes: The main objective of the course is to introduce students to basic and more detailed topics related to the local governments in Poland and other European countries.	
Teaching program: 1) The local government system: an introduction, 2) Structure and territory, 3) The functions of local authorities, 4) Finance and its control, 5) Local government and the State, 6) Policy making and democracy, 7) Leaders and the party system, 8) Bureaucracy and employees, 9) Patterns of government, 10) Local democracy, 11) Regional and local government in Poland,	
Assessment methods: Students are expected to attend the classes and to take on active part in discussions. Students will be asked to prepare one brief essay (5000 words).	
Recommended reading: • C. Panara, M. Varney (ed.), Local Government in Europe. The “fourth level” in the EU multilayered system of governance”, Abingdon 2013, • A. Coulson, A. Campbell (ed.), Local Government in Central and Eastern Europe. The Rebirth of Local Democracy, Abingdon 2008, • P. John, Local Governance in Western Europe, Manchester 2001, • J. A. Chandler, Local government today, Manchester 2001,	

Return to list of courses

Course name: **Migration and labour market**	
Course code: DEKL001	**Form of class:** Seminar,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Łukaniszyn-Domaszewska Katarzyna, k.lukaniszyn-domaszewska@po.edu.pl	
Prerequisites: English (min B1 level), no prerequisites	
Objectives of the course and learning outcomes: Equipping students with multi-faceted knowledge of migration processes and their impact on the labour market	
Teaching program: The following topics will be discussed: Migration - basic concepts; Reasons for Migration; Migrants in the Labour Force; Contemporary migrations in the world; The future of migration and how to predict it; Effects of migration processes; Integration of immigrants in the host socjety; Immigration policy; Refugees and their presence on the host country's labor market; Migrants' Entrepreneurship; Migration of High-Skilled Persons; Challenges related to the presence of foreigners in the field of security, social security, health care and education.	
Assessment methods: test paper examination, individual/group project paper report and/or presentation	
Recommended reading: 1. S. Castles, M. Miler, The Age of Migration. International Population Movements in the Modern World, Palgrave Macmillan 2009. 2. R. King, Theories and Typologies of Migration: An Overview and A Primer, Willy Brandt Series of Working Papers in International Migration and Ethnic Relations 3/12, Malmo University. 3. Migration and the economy. Economic Realities, Social Impacts	

Return to list of courses

Course name: **International Economic Integration**	
Course available with minimum number of 4 participants.	
Course code: DEKL021	**Form of class:** Seminar,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Mazur-Włodarczyk Katarzyna, k.mazur-kajta@po.opole.pl	
Prerequisites: English (min B1 level), -	
Objectives of the course and learning outcomes: The acquisition of basic knowledge in the field of international economic integration, knowledge of issues related with international economic integration in relation to globalization, the processes of international economic integration in Asia and real international cooperation processes.	
Teaching program: During the course the following topics will be discussed: 1. Introduction to the international economic integration problems 2. Asian countries in the integration process 3. International economic integration on the example of the PRC 4. One Belt and Road Initiative	
Assessment methods: To obtain the ECTS credits you have to: - be presented during 87% of lessons - actively participate in the discussion - passed positively the last test/ the term paper	

Recommended reading:

English Literature:
1. Jovanović M.N., The Economics of International Integration, EE Elgar, 2016.
2. Mazur-Kajta K., Perspectives on the opening of the New Silk Road in opinions from managers of large business enterprises located in Opole Silesia, Przegląd Nauk Stosowanych No. 15, Politechnika Opolska, Opole 2017.
3. Mazur-Kajta K., Misiurski P., Perception of the One Belt One Road Initiative by the Managers of Small Business Enterprises Located in Opole Silesia (Poland) – Results of Pilot Study, [in:] Development and Administration of Border Areas of the Czech Republic and Poland. Support for Sustainable Development, ed. Ardielli E., VŠB – Technical University of Ostrava, Ostrava 2018.
4. McCarthy D.P., International Economic Integration in Historical Perspective, Routledge 2012.
4. Asian Economic Integration Report 2018, Asian Development Bank, October 2018.
6. International Economic Integration and Asia, ed.: Plummer M.G., Jones E., 2006.

Internet sources:
1. Asia-Pacific Economic Cooperation, https://www.apec.org/
2. Association of Southeast Asia Nations, https://asean.org/

Polish Literature (supplementary):
1. Kaczmarek T.T., Globalistyka. Przyszłość globalnej gospodarki, Difin, Warszawa 2007.
2. Świerkocki J., Zarys ekonomii międzynarodowej, Polskie Wydawnictwo Ekonomiczne, Warszawa 2011.
3. Stiglitz J.E., Wizja sprawiedliwej globalizacji. Prepozycje usprawnień, Wydawnictwo Naukowe PWN, Warszawa 2007.
4. Globalizacja i regionalizacja w gospodarce światowej, ed. Orłowska R., Żołądkiewicz K., Polskie Wydawnictwo Ekonomiczne, Warszawa 2012.
5. Stosunki międzynarodowe. Teoria i praktyka, ed.: Dorosz A., Olesiński Z., Pastusiak L. Polskie Wydawnictwo Ekonomiczne, Warszawa 2018.
6. Współczesne teorie wymiany międzynarodowej i zagranicznej polityki ekonomicznej, Szkoła Główna Handlowa, Warszawa 2001.
7. Integracja Europejska. Podręcznik akademicki, ed. Marszałek A., Polskie Wydawnictwo Ekonomiczne, Warszawa 2004.
8. Bożyk P., Misala J., Integracja ekonomiczna, Polskie Wydawnictwo Ekonomiczne, Warszawa 2003.
9. Mazur-Kajta K., Spychała-Pazdan A., Wzajemne zainteresowanie Polski-Chinami na przestrzeni dziejów w kontekście odtwarzania starożytnego jedwabnego szlaku, [in:] Kulturowe i etyczne aspekty gospodarki, biznesu i zarządzania, ed. Karczewski L., Kretek H., Politechnik Opolska, Opole 2016.
10. Skopiec D., Dynamika integracji ekonomicznej w Azji Wschodniej, International Journal of Management and Economics 29, 211-235, 211.

Return to list of courses

Course name: **Stress Management**	
Course code: DZL002	**Form of class:** Seminar,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Mazur-Włodarczyk Katarzyna, k.mazur-kajta@po.opole.pl Polek-Duraj Kornelia, k.polek-duraj@po.opole.pl	
Prerequisites: English (min B1 level), no prerequisities	
Objectives of the course and learning outcomes: The course aims at giving students theoretical knowledge about causes of individual and organizational stress , their origins and ways to counteract them. After the course a student should be able to improve skills within various intelligences, including emotional one and also contribute to the creation of an organizational culture of trust, responsibility and security.	
Teaching program: Intoduction, Types and genesis of stress, burnout, Emotional and moral intelligence and stress, Counteracting stress at the individual level. Work organization, the art of relaxation, Counteracting stress in organizational activities. Creating an organizational culture of responsibility, trust and security	
Assessment methods: Lecture Activity performed using audiovisual techniques, supplemented by case studies, group work and discussions with students and encouraging them actively to engage in problem solving	
Recommended reading: Literature: 1. Goleman D., Emotional Intelligence: Why It Can Matter More Than IQ, Bantam Books, NY 1996. 2. Quick J.C., Quick J.D., Nelson D.L., Hurrell J.J. Preventive stress management in organisations. Washington, DC, American Psychological Association. 1997. 3. Cooper R. , A. Savaf, Executive EQ, Emotional inteligence i Leadership and organizations, Advanced Intelligence Technologies, LLC, 1997. 4. Ivancevich J.M., Matteson M.T., Freedman S.M., Philips J.S. Worksite Stress Management Interventions. American Psychologist, 45, 1990. 5. Lynn A.B. The Emotional intelligence activity book.., Amacom Books 2002.	

Return to list of courses

Course name:
Decision Making in the System for Pairwise Judgments

Course available with minimum number of 4 participants.

Course code: DZL003	**Form of class:** Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30

Language of instruction:
English

Name of the lecturer and contact information:
Kazibudzki Paweł, p.kazibudzki@po.opole.pl

Prerequisites:
English (min B1 level),

This course is intended for students who have some background in mathematics,
English (min B1 level)

Objectives of the course and learning outcomes:
This course introduces students to decision making processes in conditions of uncertainty when multiple criteria and multiple possible alternative options are taken into consideration. Emphasis is given on relatively simple way of coping with complex decisional problems i.e. making pairwise judgments concerning alternative solutions of a problem. The application of the particular system for pairwise judgments is introduced and its applicability is widely discussed.

Teaching program:
Ways of coping with complex decisional problems – How to organize knowledge to make a right decision? – The Analytic Hierarchy Process, what it is and how it works – Rules of analytical reasoning – How to measure intuitive judgments – Can intuition be mistaken? – Is a hierarchy the way people think? – Classification and construction of hierarchies – Practical examples of hierarchies – How to measure intangible? – Do criteria are necessary in decisional problems? – How to measure importance of criteria in decisional problems? – How to structure multiple criteria decisional problems? – Is our way of reasoning consistent? – What is the index of consistency and how to calculate it? – Examples of Analytic Hierarchy Process applications in managerial and marketing problems.

Assessment methods:
Individual/group project paper report and its presentation.

Recommended reading:
T.L. Saaty, Fundamentals of Decision Making and Priority Theory with the Analytic Hierarchy Process, RWS Publications, Pittsburgh 2006.
T.L. Saaty, L.G. Vargas, The Logic of Priorities. Applications in Business, Energy, Health, and Transportation, RWS Publications, Pittsburgh 1991.
T.L. Saaty, K.P. Kearns, Analytical Planning. The Organization of Systems, RWS Publications, Pittsburgh 1991.
T.L. Saaty, Decision Making for Leaders. The Analytical Hierarchy Process for Decisions in a Complex World, RWS Publications, Pittsburgh 1990.

Return to list of courses

Course name: **Change Management**	
Course code: DZL004	**Form of class:** Lecture,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Karaś Elżbieta, e.karas@po.opole.pl	
Prerequisites: English (min B1 level), No prerequisites	
Objectives of the course and learning outcomes: The aim of the course is to gain knowledge about the sources of change in the organization, types of changes, styles of change management. The learning outcomes will be acquiring by students skills to manage themselves, manage others and manage the process of change, the ability to change the organizational culture, possibility to influence others and motivate them to participate in organizational changes.	
Teaching program: 1. Genesis of change in organization. 2. Types and paths of change. 3. Managing ourselves, managing others and managing the change process. 4. Transition phases. 5. Organization's life cycle (organization's DNA). 6. The "laws" of organizational development. 7. Kaleidoscope of change:The path of change, Starting poin, Goal - attitudes, values, behaviors, work effects, Change management style (education and commissioning, cooperation, complicity, injunction, coercion), levers of change and roles during change. 8. The organization's cultural network and its change. 9. Context of change: Time, Range, Variety, Ability to change, Possibilities of change, Willingness to change, identification of main stakeholders, people and departments with decission power.	
Assessment methods: test, report	
Recommended reading: 1.J.Balogun, V H.Hailey, 2008, Exploring Strategic Change, Pearson Education Limited. 2.W. Briges, 2003, Managing Transitions. Making The Most of Change, Da Capo Press. 3. M. Easterby-Smith, R. Thorpe, P. R. Jackson, 2015, LA, Sage Publications.	

Return to list of courses

Course name: **Conflicts resolution**	
Course available with minimum number of 4 participants.	
Course code: DZL007	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Klemens Brygida, b.klemens@po.opole.pl	
Prerequisites: English (min B1 level), -	
Objectives of the course and learning outcomes: Students learn: how response to a conflict situation, how managing conflict situations, how be better in conflict resolution, how to relax in conflict situation.	
Teaching program: Levels of conflicts; Defining conflict: where do you stand? Response to conflict: fight or flight? Examples of conflicts (moral, religious, family, intergroup, organizational) Know yourself; Cooperation – competition; Managing conflict in small and in large groups; Why trust is critical into relationships? Managing trust and distrust in conflict situations; Training in conflict resolution; Relaxation methods.	
Assessment methods: - group work and discussions with students, - audiovisual techniques, - case studies, - problem solving.	
Recommended reading: M. Deutsch, P.T. Coleman, E.C. Marcus, The Handbook of Conflict Resolution. Theory and Practice, Jossey-Bass, San Francisco 2006; J. Lambert, S. Myers, 50 Activities for Conflict Resolution. Group Learning and Self Development Exercises, Human Resource Development Press, Massachusetts 1999.	

Return to list of courses

Course name: **Oragnizational Culture**	
Course available with minimum number of 4 participants.	
Course code: DZL042	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Mazur-Włodarczyk Katarzyna, k.mazur-kajta@po.opole.pl	
Prerequisites: English (min B1 level), Basics of Management; knowledge about organization, structure of organization	
Objectives of the course and learning outcomes: Understanding essence of the organizational culture, understanding differences between national cultures. Main goal is for the students to be able to describe cultural differences and their influence on the Organizations in different countries.	
Teaching program: LECTURES: Organizational culture, definition, types and profiles of culture, national cultures and organizational cultures, culture shock , leadership in organization and national culture, the seven cultures of capitalism, changing of culture. CLASSES: - Definition of Organizational Culture - Culture Typologies: Deal	
Assessment methods: On the basis of participation in discussions. Test and grade from working in groups	
Recommended reading: J.Martin, Cultures in Organizations: Three Perspectives E.H. Schein, Organizational Culture and Leadership Ch.M. Hampden- Turner, F.Trompenaars, Building Cross-Cultural Competence: How to Create Wealth from Conflicting Values Kim S. Cameron Robert E. Quinn. - Organizational Culture Ch. M. Hampden-Turner	

Return to list of courses

Course name: **Ethics in management**	
Course available with minimum number of 4 participants.	
Course code: DZM004	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Edaich Said, s.edaich@po.opole.pl Polek-Duraj Kornelia, k.polek-duraj@po.opole.pl	
Prerequisites: English (min B1 level), ---	
Objectives of the course and learning outcomes: Upon successful completion of this Ethics in Management course, the student will be able to: - Demonstrate understanding of the definition of ethics and the importance and role ethical behavior serves in management and in the business world today. -Identify various ethical issues that occur in the workplace. -Evaluate the concept of Corporate Social Responsibility, and explore its relevance to ethical business activity.	
Teaching program: - The Nature of Moral Problems in Management - Moral Analysis and Economic Outcomes - Moral Analysis and Legal Requirements - Moral Analysis and Ethical Duties - Why Should a Business Manager Be Moral? - How Can a Business Organization Be Made Moral?	
Assessment methods: Written exam	
Recommended reading: LaRue T. Hosmer, The ethics of management, 2010.	

Return to list of courses

Course name: **Diversity management**	
Course code: DZMZP1_4	**Form of class:** Lecture, Group tutorial,
Level of study: postgraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Łukaniszyn-Domaszewska Katarzyna, k.lukaniszyn-domaszewska@po.edu.pl	
Prerequisites: English (min B1 level), English (min B1 level)	
Objectives of the course and learning outcomes: This course provides insights and experience into diversity management. Course objectives are to: Provide an understanding of the key issues of diversity management as well as intersections with other strategies: HRM, CSR. Learn and apply key elements of diversity management. Understand the business case of diversity management. Understand differences between diversity management, equal rights and equal treatment.	
Teaching program: 1. Fundamentals of diversity	
Assessment methods: Constant evaluation of student’s work. Final test in the end of semester.	
Recommended reading: Harrison, D. A.,	

Return to list of courses

Course name: **Microeconomics**	
Course available with minimum number of 4 participants.	
Course code: EKL008	**Form of class:** Lecture, Group tutorial, Seminar,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Łukaniszyn-Domaszewska Katarzyna, k.lukaniszyn-domaszewska@po.edu.pl Rokita-Poskart Diana, d.rokita@po.opole.pl	
Prerequisites: English (min B1 level), -	
Objectives of the course and learning outcomes: Understanding the basic microeconomics category, understanding principles of function the main subjects in the economy of public system , understating to influence of economy system on management area	
Teaching program: Nature of microeconomics, consumer behavior and individual demand, market demand, optimal input combinations and cost functions, market structure, price and output (perfect competition, monopoly, monopolistic competition, oligopoly)	
Assessment methods: On the basis of participation in discussions	
Recommended reading: N.G. Mankiw , Principles of Microeconomics, O'Sullivan, S. Sheffrin, St. Perez, Microeconomics: Principles, Applications, and Tools C. R. McConnell Microeconomics	

Return to list of courses

Course name: **Mathematics**	
Course available with minimum number of 4 participants.	
Course code: EKL011	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Szewczyk Mirosława, m.szewczyk@po.opole.pl	
Prerequisites: English (min B1 level), This course is intended for students who have a limited background in mathematics.	
Objectives of the course and learning outcomes: This course introduces students to the mathematical language, skills and techniques necessary for success in many of today's fields. Emphasis is placed on applications in business. Developing skills of view expression on the basis of mathematical conceptions, symbols and terms.	
Teaching program: 1. Review of fundamental 2. Matrices. Operations on matrices. Determinants and matrix inversion. 2. Systems of linear equations. Systems of linear inequalities. 3. Relations and functions. 4. Sequences, series and limits. 5. Differentiation (function of one variable). 7. Optimization 8. Differentiation (function of more than one variable) 9. Integration. 10. Differential equation.	
Assessment methods: Practical assignments. Final exam.	
Recommended reading: M. Timbrell, Mathematics for economists: an introduction, Blackwell, Oxford 1990. M.Rosser, Basic Mathematics for Economists, Routledge, London 2003. V. C. Mavron, T. N. Phillips, Elements of Mathematics for Economics and Finance Springer-Verlag, London 2007	

Return to list of courses

Course name:
Sustainable Regional Development

Course available with minimum number of 4 participants.

Course code: EKL024	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30

Language of instruction:
English

Name of the lecturer and contact information:
Rokita-Poskart Diana, d.rokita@po.opole.pl

Prerequisites:
English (min B1 level),
-

Objectives of the course and learning outcomes:
Developing a full awareness and awakening public interest of interrelated economic, social, political and environmental issues.
Allowing everyone to acquire the knowledge and skills necessary for environmental improvement.
Creating new patterns of behavior, shaping attitudes, values and beliefs of individuals, groups and societies, taking into account the concern for environmental quality

Teaching program:
Explain the basic concepts of ecology, ecological education and environmental protection,
Ethical and sociological aspects of ecology and environmental protection: - Environmental education, - Methods of social psychology in shaping the ecology of human attitudes, - Environmental awareness, - Shallow and deep ecology,
Environmental education as an international obligation,
Organization of environmental education in Poland
Basis for environmental protection (including the basic threats and challenges of the modern world, the evolution of approaches to issues of ecology and environmental management model)
Cleaner Production as a philosophy and strategy of environmental protection
Models and definitions found in the conservation and environmental management,
Renewable and non-renewable resources of the environment and the rational exploitation

Assessment methods:

Recommended reading:
Harrison Paul, The Third Rewolution. Environment, Population and a Sustainable World, I.B. Tauris/Penguin Books, London-New York, 1992,
Martell, Luke, Ecology and Society: An Introduction, Polity Press, 1994,
Michael Tobias ed, Deep Ecology, Avant Books, ISBN 0-932238-13-0, 1988,
Palmer, J.A., Environmental Education in the 21st Century: Theory, Practice, Progress, and Promise, Routledge, 1998,
Sawin Janet, Charting a New Energy Future, State of the World 2003, By Lester R. Brown. Boston: W. W. Norton

Return to list of courses

Course name: **Introduction to e-business**	
Course available with minimum number of 4 participants.	
Course code: EKL026	**Form of class:** Lecture, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Wielki Janusz, j.wielki@po.opole.pl	
Prerequisites: English (min B1 level), Information Technology	
Objectives of the course and learning outcomes: C1 – understanding the background of changes taking place in the contemporary economy and the role of information technology in these processes, C2 – understanding such terms as: e-economy, e-commerce, e-business, e-space, information society and relations between them, C3 – understanding the role of the Internet as a new business platform and its influence on changes in functioning of contemporary organizations, C4 - understanding the role of mobile technologies in the context of its impact on functioning of contemporary organizations and relations with the internet-based technologies, C5 – understanding the challenges faced by contemporary organizations in the context of electronic environment utilization.	
Teaching program: Overview of changes taking place in the contemporary economy and the emergence of the post-industrial economy. Development of information technology and its role in the changes taking place in the contemporary economy. Electronic economy development and the impact of the Internet in these processes. Phases of the Internet development. Virtualization of the business activities of business organizations and two dimensions of this phenomenon. Typology of the Internet utilization by contemporary enterprises. Business models used by business organization and the impact of the Internet on changes in this sphere. The development of the tools based on internet and mobile technologies and their impact on functioning of organizations. The impact of the Internet and mobile technologies on changes in value creation processes. Emergence of new challenges connected with utilization of the electronic environment by contemporary enterprises.	
Assessment methods: lecture: exam-test, individual consultations, laboratory: active participation in laboratory.	
Recommended reading: 1. Laudon J., Laudon K.: Management Information Systems with MyMISLab. Harlow: Pearson Education, 2012. 2. Bonnet A. et al.: Leading Digital. Boston: Harvard Business Review Press, 2014. 3. Brynjolfsson E., McAfee A.: The Second Machine Age. New York: W. W. Norton	

Return to list of courses

Course name:
Trade and foreign investments

Course available with minimum number of 4 participants.

Course code: EKL027	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30

Language of instruction:
English

Name of the lecturer and contact information:
Łukaniszyn-Domaszewska Katarzyna, k.lukaniszyn-domaszewska@po.edu.pl

Prerequisites:
English (min B1 level),
Basic knowledge of micro and macroeconomics

Objectives of the course and learning outcomes:
The understanding of internationalization mechanisms and their influence on the economy.

Teaching program:
Course topics:

1. Historical development of international world economic activities. Causes and consequences of globalization
2. World Economic Geography. The dimensions and developments of income inequality
3. Forms of international business activity.
4. The theory of international trade (the theory of absolute cost advantages, the theory of comparative cost advantages b) Heckscher-Ohlin theory c) Neo-factor proportions – Leontief's theory
5. Determinants and structure of trade and current account
6. International capital movements. Theories of international direct investment.
7. Foreign activities of German and Polish companies
8. Impact of cultural dimensions on the internationalization process
9. Management of international business activity using the example of the selected companies
10. International Integration Agreements a) Trade Agreements b) Direct Investment Agreements
11. The Impact of the Great Crisis 2008-2010
12. Position of China in the world economy

Assessment methods:
Analysis of case studies, test

Recommended reading:
Hofstede G. , Cultures and oorganizations, London, New Yorket al.1991
Kania M., The Economic and Cultural Conditions and Conseqences of Direct German Investments in Poland, Oficyna Wydawnicza Politechniki Opolskiej, Opole, 2009
Perlitz M., Internationales Management, G. Fischer Verlag, Stuttgart Jena, 1995
Schulte-Mattler H., Direktinvestitionen: Gründe für das Enstehen von multinationalen Unternehmen, Frankfurt am Main 1998
Welge M.K., Holtbrügge D., Internationales Management, Stuttgart, 2006
Weber M., Die protestantische Ethik und der Geist des Kapitalismus, Area Verlag GmbH, Erftstadt 2007

Return to list of courses

Course name:
Handel und Auslandsinvestitionen

Course available with minimum number of 4 participants.

Course code: EKL027/DE	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30

Language of instruction:
Deutsche

Name of the lecturer and contact information:
Bernat Maria, m.bernat@po.edu.pl
Łukaniszyn-Domaszewska Katarzyna, k.lukaniszyn-domaszewska@po.edu.pl

Prerequisites:
English (min B1 level),
Voraussetzungen: Grundwissen der Mikro- und Makroökonomie

Objectives of the course and learning outcomes:
Ziele des Kurses:
Das Verständnis von Internationalisierungsmechanismen und deren Einfluss auf die Wirtschaft.

Teaching program:
Lernprogramm:
1. Historische Entwicklung länderübergreifender Weltwirtschaftsaktivitäten. Ursachen und Folgen der Globalisierung
2. Weltwirtschaftsgeographie. Die Dimensionen und Entwicklungen der Einkommensungleichheit
3. Formen der Internazionalen Unternehmungstätigkeit.
4. Theorie des Internationalen Handels (Theorie der absoluten Kostenvorteile, Theorie der komparativen Kostenvorteile b) Heckscher-Ohlin-Theorem c) Neofaktorproportionen –Theoren von Leontief
5. Determinanten uns Struktur der Handels und Leistungsbilanz
6. Internationale Kapitalbewegungen Theorien der internationalen Direktinvestitionen.
7. Auslandsaktivitäten deutscher und polnischer Unternehmen
8. Einfluss der kulturellen Diemensionen auf den Internsionalisierunsprozess
9. Management internationaler Unternehmungstätigkeit am Beispiel der ausgawählten Unterhehmen
10. Internationale Integrationsabkommen a) Handelsabkommen b) Abkommen über Direktinvestitionen
11. Der Einfluß der Weltwirtschaftskrise 2008-2010
12. Stellung China in der Weltwirtschaft

Assessment methods:
Bewertungsmethoden: Analyse der Fallstudien, Test

Recommended reading:
Hofstede G. , Cultures and oorganizations, London, New Yorket al.1991
Kania M., The Economic and Cultural Conditions and Conseqences of Direct German Investments in Poland, Oficyna Wydawnicza Politechniki Opolskiej, Opole, 2009
Perlitz M., Internationales Management, G. Fischer Verlag, Stuttgart Jena, 1995
Schulte-Mattler H., Direktinvestitionen: Gründe für das Enstehen von multinationalen Unternehmen, Frankfurt am Main 1998
Welge M.K., Holtbrügge D., Internationales Management, Stuttgart, 2006
Weber M., Die protestantische Ethik und der Geist des Kapitalismus, Area Verlag GmbH, Erftstadt 2007

Return to list of courses

Course name:
Techniques of negotiations and mediations

Course available with minimum number of 4 participants.

Course code: EKL040	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30

Language of instruction:
English

Name of the lecturer and contact information:
Klemens Brygida, b.klemens@po.opole.pl

Prerequisites:
English (min B1 level),
-

Objectives of the course and learning outcomes:
Students learn: how to communicate in a good way, how to be assertive, how to listening, how to be a good negotiator

Teaching program:
What is negotiation?
What kinds of negotiations do we have?
How to be good negotiator?
The importance of first impression;
Negotiation strategies;
Negotiations process;
The role of time;
Art and the importance of mediation in business;
Negotiation techniques: difficult partner, part-power of attorney, illusory concession, delay technique, shocking offer, false shock, wolf in sheep's skin,
Stress and techniques of it's elimination;
Relaxation methods

Assessment methods:
- group work and discussions with students,
- audiovisual techniques,
- case studies,
- problem solving.

Recommended reading:
R. Fisher, B. Patton, W. Ury, Getting to yes: Negotiationg Agreement without Giving in, New York 1991;
G. Kennedy, Essential Negotiation. An A-Z Guide, The Economist Newspaper, U.K. 2009;
A. Lempereur, Negotiation, Business School, 2010;
H, Raiffa, The Art and Science of Negotiation, Harvard College 2003;
P. Steel, T. Beasor, Business Negotiation, Gower Publishing Limited, Burlington 1999;
W. Ury, Getting past no: negotiating your way from confrontation to cooperation, New York 1993.

Return to list of courses

Course name: **Methodology of Market Research**	
Course available with minimum number of 4 participants.	
Course code: EKL042	**Form of class:** Lecture, Group tutorial, Seminar,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Szewczyk Mirosława, m.szewczyk@po.opole.pl	
Prerequisites: English (min B1 level), none	
Objectives of the course and learning outcomes: Student is to know the methods and techniques of developing and realize its own market research. Student is to know the process of market research formulation, realization and completion.	
Teaching program: Market research design; Desk research; Primary research and methods; Sampling; Questionnaire design; Data gathering; Data analysis and presentation	
Assessment methods: Case study	
Recommended reading: P. Hague, N. Hague, Marketing Research in Practice. A guide to the Basics, Kogan Page Ltd., 2004	

Return to list of courses

Course name: **Macroeconomics**	
Course available with minimum number of 4 participants.	
Course code: EKM002	**Form of class:** Lecture, Seminar,
Level of study: postgraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Łukaniszyn-Domaszewska Katarzyna, k.lukaniszyn-domaszewska@po.edu.pl Rokita-Poskart Diana, d.rokita@po.opole.pl	
Prerequisites: English (min B1 level), Basic economic knowledge	
Objectives of the course and learning outcomes: The main objective of the course is to provide the students opportunity to gain or enhance basic macroeconomic knowledge	
Teaching program: -Introduction to macroeconomics -System od National Accounts -National income and price determination -Consumption and Saving -Money market -Inflation -Monetary and fiscal policy -Economic growth and development -Macroeconomic shocks and fluctuation	
Assessment methods: Case studies and an end-of-course test	
Recommended reading: David Begg, Stanley Fischer, Rudiger Dornbusch, Economics, London 2005. David Andolfatto, Macroeconomic Theory and Policy Preliminary Draft - http://www.sfu.ca/~dandolfa/macro2005.pdf Milton Freedman, Capitalsm and Freedom, University of Chicago Press, 2002. N. Gregory Mankiw, Macroeconomics,Harvard University 2012.	

Return to list of courses

Course name: **Makroökonomie**	
Course code: EKM002/DE	**Form of class:** Lecture, Group tutorial,
Level of study: postgraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: Deutsch	
Name of the lecturer and contact information: Bernat Maria, m.bernat@po.edu.pl Łukaniszyn-Domaszewska Katarzyna, k.lukaniszyn-domaszewska@po.edu.pl	
Prerequisites: English (min B1 level), ---	
Objectives of the course and learning outcomes: Student beherrscht die Terminologie in der Wirtschaft verwendet, versteht seine Quellen und Anwendungen im Rahmen der entsprechenden Disziplinen an der Oberstufe Student hat eine erweiterte Kenntnisse über die Mechanismen der sozialen, wirtschaftlichen Regeln Student kann in vertiefte theoretische Wissen nutzen, sowie die Erfassung der Daten notwendig, zu analysieren und zu interpretieren, Prozesse und Phänomene in der Ökonomie und verwandten Disziplinen	
Teaching program: Das Bruttoinlandsproduct (Einkommen, Produktion Und wirtschaftlicher Kreislauf) Geld und Inflation Zentralbankpolitik, Geldmenge steuerung Staatsverschuldung Und Budgetdefizit Die offene Volksvirtschaft (Kapital und Guterströme) IS-LM Modell Das Gesamntnachfrage Und Gesam angebots-Modell Das Mundell-Fleming Modell Zwieschen Infaltion Und Arbeitslosiegkeit Theorie gesamntwirtschaftlicher Schwankungen Makroökonomische Wirtschaftspolitik	
Assessment methods: Vorträge, Analyse der Fallstudie , schriftliche Prüfung	
Recommended reading: N.G. Mankiw, Makrookonomik mit vielen Fallstudien, Stuttgart 2000 W. A. Koch, Ch. Czogalla, Grundlagen der Wirtschaftspolitik, Stuttgart 2004 Samuelson, P.A., Nordhaus, W.D., Volkswirtschaftslehre, Bd. 1 und 2, Köln 2002 und 2005	

Return to list of courses

Course name: **Statistical Inference**	
Course available with minimum number of 4 participants.	
Course code: EKM003	**Form of class:** Lecture, Group tutorial,
Level of study: postgraduate	**Duration:** 1 semester
Number of ECTS credits: 7	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Szewczyk Mirosława, m.szewczyk@po.opole.pl	
Prerequisites: English (min B1 level), This course is intended for students who have a limited background in mathematics.	
Objectives of the course and learning outcomes: The course covers the basic statistical methods for understanding, modelling and interpreting data together with an introduction to the concepts of statistical theory. Emphasis is placed on applications in business. Students will be expected to analyse data, design and implement solutions to various problems.	
Teaching program: 1.Probability 2.Discrete and continuous random variables. Distributions covered: Binomial, Poisson, Normal. The Chi-square distribution. T-Student distribution. Relationship between probability and the area under a probability curve. The normal distribution and the associated statistics and probabilities. 3.Populations. Samples from populations. 4.Estimation of parameters, confidence intervals and 5.Hypothesis tests. One-sample and two-sample tests. Chi-square tests of independence, homogeneity. Contingency tables.	
Assessment methods: Practical assignments and final exam.	
Recommended reading: E. Mansfield; Statistics for Business and Economic: Methods and Applications; W.W. Norton	

Return to list of courses

Course name: **Econometric modelling and forecasting**	
Course available with minimum number of 4 participants.	
Course code: EKM004	**Form of class:** Lecture, Laboratory,
Level of study: postgraduate	**Duration:** 1 semester
Number of ECTS credits: 7	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Mach Łukasz, l.mach@po.opole.pl Szewczyk Mirosława, m.szewczyk@po.opole.pl	
Prerequisites: English (min B1 level), Econometric, Statistics.	
Objectives of the course and learning outcomes: The aim of the subject is to give students the ability to prepare forecasts and simulations regarding micro- and macroeconomics affairs	
Teaching program: LECTURES: General Introduction, Identifying Patterns in Time Series Data (Trend Analysis, Analysis of Seasonalit), Exponential Smoothing (Brown and Holt models), Seasonal Decomposition (Winters model ARIMA Methodology,), quantity forecast models (logit, probit, discriminations analysis use in economic and mamagenet phenomens). LABORATORY: General Introduction, Identifying Patterns in Time Series Data (Trend Analysis, Analysis of Seasonalit), Exponential Smoothing (Brown and Holt models), Seasonal Decomposition (Winters model ARIMA Methodology,), quantity forecast models (logit, probit, discriminations analysis use in economic and mamagenet phenomens).	
Assessment methods: Presentations, work in Statistica 9.0 from Statsoft and Gretl. Project and exam	
Recommended reading: Maria Cieślak – Prognozowanie gospodarcze Józef Biolik, Andrzej Stanisław Barczak – Podstawy ekonometrii Aleksander Zeliaś – Teoria prognozy Maddala G.S. Ekonometria Dziechciarz Józef – Ekonometria. Metody, Przykłady, Zadania Radzikowska Barbara – Metody prognozowania Gruszczyński Marek – Ekonometria i badania operacyjne Dittmann Paweł – Prognozowanie w przedsiębiorstwie	

Return to list of courses

Course name: **Concepts of Management**	
Course available with minimum number of 4 participants.	
Course code: EKM016	**Form of class:** Lecture, Group tutorial,
Level of study: postgraduate	**Duration:** 1 semester
Number of ECTS credits: 7	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Karaś Elżbieta, e.karas@po.opole.pl	
Prerequisites: English (min B1 level), Knowledge of basic enterprise management	
Objectives of the course and learning outcomes: Preparing students to find ways of solving problems in area of management and to use basic new methods and techniques.	
Teaching program: Introduction - theoretic basis of quality management Total Quality Management Business Process Reengineering Knowledge Organization Just in Time System Learning Organization Kaizen Management System Lean Management Benchmarking Organization of the Network Virtual enterprise - an example of business A human aspect of the new methods of management	
Assessment methods: Lecture and multimedia presentations, group discussions, case studies, preparing papers.	
Recommended reading: Imai M.: Kaizen. The Key to Japan's Competitive Success, New York 2007 Hoyle D.: ISO 9000 Quality Systems Handbook, Oxford 2003 Liker J. K.: Toyota Way, New York 2003 Oakland J.: Quality Management, Oxford 2004 Senge Peter M.: The Fifth Discipline: The Art	

Return to list of courses

Course name: **Quality Policy**	
Course available with minimum number of 4 participants.	
Course code: EKM020	**Form of class:** Lecture, Group tutorial,
Level of study: postgraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Karaś Elżbieta, e.karas@po.opole.pl	
Prerequisites: English (min B1 level), Knowledge of basic enterprise management	
Objectives of the course and learning outcomes: Preparing students to find ways of solving problems in area of quality management and to use basic methods and techniques.	
Teaching program: Fundamental issues of quality management Method of self-assessment by quality criteria Method of process mapping Just-in-time system Ishikawa's and Pareto's diagrams Kaizen Management System Creating documentation according to ISO 9000 standards Guidelines for benchmarking in enterprise	
Assessment methods: Lecture and multimedia presentations, group discussions, case studies, preparing papers	
Recommended reading: Imai M.: Kaizen. The Key to Japan's Competitive Success, New York 2007 Hoyle D.: ISO 9000 Quality Systems Handbook, Oxford 2003 Liker J. K.: Toyota Way, New York 2003 Oakland J.: Quality Management, Oxford 2004	

Return to list of courses

Course name: **Social research methods**	
Course available with minimum number of 4 participants.	
Course code: EKM032	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Edaich Said, s.edaich@po.opole.pl	
Prerequisites: English (min B1 level), -	
Objectives of the course and learning outcomes: By the end of the course, and having completed the essential reading and activities the student will be able to: formulate researchable questions, define a research strategy and design a research project to answer a research question, discuss the practice and principles of qualitative and quantitative social research	
Teaching program: -Approaches to Research, Research ethics and Research -Research Methodology -Data collection: Sampling, Case Study Method, Survey Method, Experimental Method, Available Data, Observation, Interviews, Questionnaires, Tests -Data analysis: Measurement Principles, Qualitative Data, Quantitative Data -Action: The Report, Using the Results	
Assessment methods: Graded research project, written exam	
Recommended reading: J. Adams, Research Methods for Graduate Business and Social Science Students, 2007. G. Guthrie, Basic Research Methods : An Entry to Social Science Research, 2010. T. Gschwend, F. Schimmelfennig, Research Design in political Science. How to practice what they preach, Palgrave Macmillan, 2011. K. Singh, Quantitative Social Research Methods, 2007. N. Walliman, Social Research Methods, 2006. K. Yang, Making Sense of Statistical Methods in Social Research, 2010.	

Return to list of courses

Course name: **Communication in team leading**	
Course available with minimum number of 4 participants.	
Course code: EKM034	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Mazur-Włodarczyk Katarzyna, k.mazur-kajta@po.opole.pl	
Prerequisites: English (min B1 level), -	
Objectives of the course and learning outcomes: Students learn: how to communicate in a good way, how to be assertive, how to listening, how to speak, how to speak in public.	
Teaching program: What is communication? Communication act elements like: sender, addressee, announcement, channel, noise, feedback, effect; Verbal and nonverbal communication; The role of communication; Tasks requirement; Good communication principles; Good communication techniques; Public speech; Accept criticism and commendation; Assertiveness techniques like: announcement “I”; 4 step-technique; border building technique; fog curtains technique	
Assessment methods: - group work and discussions with students, - audiovisual techniques, - case studies, - problem solving.	
Recommended reading: Joep Cornelissen, Corporate Communication. A Guide to Theory and Practise, SAGE Publications, Singapore 2011; Mary Ellen Guffey, Dana Loewy, Business Communication. Process and Product, South-Western, Mason 2011; Julia T. Wood, Interpersonal Communication Everyday Encounters, Wadsworth, Boston 2013.	

Return to list of courses

Course name:
Society and culture of Europe

Course code: EKM041	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30

Language of instruction:
English

Name of the lecturer and contact information:
Edaich Said, s.edaich@po.opole.pl

Prerequisites:
English (min B1 level),

Objectives of the course and learning outcomes:
Course description: culture-territorial identities on subsequent levels: local, regional, national, international, European. Identity cultivation of minority groups according to ethnicity, religion, life style, sexual orientation and other socially crucial and culturally significant criteria. Prejudices and their alterations. Intercultural dialogue. Alterations of collective cultural identities. Common European identity and its relations to European democratic civil society. Understanding of ethic norms and diversities in their understanding.

The education effects – skills and abilities: understanding of national identity understanding of European integration processes seen as culture and identity categories; analysis of identity models (with prejudices) as dynamic cultural phenomenon. Understanding the differences between European countries

Teaching program:
Week 1-5
Introduction in humanistic and social sciences. Introduction in the research methods.
Week 6
„Construction of a nation", - theories of nation
Week. 7
From tribes and ethnic symbols to state symbols.
Week. 8
The role of myths in the building of community.
Week. 9
Identity in modern Europe. National stereotype. Being Polish
Week. 10
Family and its evaluation. Divorces in Europe and Poland.
Week. 11
The place of men and women in the European society
Week. 12
Masculinity and femininity: The taboo dimension of national cultures
Week 13
Using color. From the old masters to the modern advertisement.
Week. 14
Sex and body in the advertisement and art.
Week 15
Between the authorities' control over the content and dissemination of information, and a ban on some publications for fear that some disorderly content might be printed. Censorship in Europe

The students have to read set texts and be prepared to discussion. The final grade in 90% depends on the grade obtained in report from the research work.

Assessment methods:
Group project, report from research work and its presentation

Recommended reading:
Babbie, E. R. (1998). The practice of social research. International Thomson Publishing Services.
Babbie, E. R. (2013). The basics of social research. Cengage Learning.
Chester, R. (2012). Divorce in Europe (Vol. 3). Springer Science

Return to list of courses

Course name: **Fundamentals of Management**	
Course available with minimum number of 4 participants.	
Course code: ZL008	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 8	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Dymek Łukasz, l.dymek@po.opole.pl Kazibudzki Paweł, p.kazibudzki@po.opole.pl	
Prerequisites: English (min B1 level), -	
Objectives of the course and learning outcomes: The aim of the course is to develop and strengthen today's most important management skills and to understand the management principles, organizational behavior, as well as basic financial statement, controlling and human resources management. It gives the introduction into all areas of management.	
Teaching program: 1. Management and Enterpreneurship 2. The Global Enivirоment: Culture, Social Responsibility and Sustainability 3. Planning: Problem Solving and Decision Making, Strategic and Operating Plan 4. Organizing work: job design, authority and delegating work 5. Change Management 6. Human Resources Management 7. Organizational Behaviour 8. Basic of Financial Management and Controlling	
Assessment methods: On the basics of participation in discussion. Constant evaluation of student’ s work.	
Recommended reading: Robbins S.P., De Cenzo D., Coulter M., Fundamentals of management, Prentice Hall, 2012. Griffin R.W., Fundamentals of management, South-Western College Pub, 2011. Lussier R. N., Management Fundamentals: Concepts, Applications, Skill Development	

Return to list of courses

Course name: **Science of Organization**	
Course available with minimum number of 4 participants.	
Course code: ZL009	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 7	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Dymek Łukasz, l.dymek@po.opole.pl	
Prerequisites: English (min B1 level), Basic knowledge of specific legal terminology	
Objectives of the course and learning outcomes: Student is required to know what an organization is, what are basic theories on organization in the science. This knowledge is essential in further building organizational structures. Familiarization to the changes n organization, corporate social responsibility is necessary to efficient organization management.	
Teaching program: Theory of organization. Basic trends in theory of organization. Definition, types and features of organization. Organization models. Organization environment. Organization life cycle. Corporate social responsibility. Resources in organization. Building organizational structures. Principles of organization management. Changes in organization. Cooperation within organization.	
Assessment methods: Discussion, practice work, test, case study.	
Recommended reading: B. Kożuch, Science of Organization, Cedewu.	

Return to list of courses

Course name: **Mathematics in Economics and Management**	
Course available with minimum number of 4 participants.	
Course code: ZL014	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 7	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Szewczyk Mirosława, m.szewczyk@po.opole.pl	
Prerequisites: English (min B1 level), This course is intended for students who have a limited background in mathematics.	
Objectives of the course and learning outcomes: This course introduces students to the mathematical language, skills and techniques necessary for success in many of today's fields. Emphasis is placed on applications in business. Developing skills of view expression on the basis of mathematical conceptions, symbols and terms.	
Teaching program: 1. Review of fundamental 2. Matrices. Operations on matrices. Determinants and matrix inversion. 2. Systems of linear equations. Systems of linear inequalities. 3. Relations and functions. 4. Sequences, series and limits. 5. Differentiation (function of one variable). 7. Optimization 8. Differentiation (function of more than one variable) 9. Integration. 10. Differential equation. Applications to economics and management	
Assessment methods: Practical assignments. Final exam.	
Recommended reading: M. Timbrell, Mathematics for economists: an introduction, Blackwell, Oxford 1990. M.Rosser, Basic Mathematics for Economists, Routledge, London 2003. V. C. Mavron, T. N. Phillips, Elements of Mathematics for Economics and Finance Springer-Verlag, London 2007.	

Return to list of courses

Course name: **Descriptive Statistics**	
Course available with minimum number of 4 participants.	
Course code: ZL015	**Form of class:** Lecture, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Szewczyk Mirosława, m.szewczyk@po.opole.pl	
Prerequisites: English (min B1 level), This course is intended for students who have a limited background in mathematics.	
Objectives of the course and learning outcomes: This course introduces students to the statistical language, skills and techniques necessary for success in many of today's fields. Emphasis is placed on applications in business. Developing skills of view expression on the basis of symbols and terms. Students will be expected to analyse data, design and implement solutions to various problems.	
Teaching program: 1. Introduction to Statistics 2. Descriptive statistics. Measures of central tendency, measures of dispersion, measures of asymmetry. Empirical distributions and its graphics illustrations. Box-and-whisker plot. Measures of two aspects of the “shape” of the distributions: skewness and kurtosis. 3. Regression and correlation analysis. Correlation coefficients: Pearson correlation and Spearman’s rho. Scatterplot. Simple linear regression. Method of least squares. 4. Time Series and Index Numbers. Linear trend.	
Assessment methods: Practical assignments and final exam.	
Recommended reading: E. Mansfield; Statistics for Business and Economic: Methods and Applications; W.W. Norton	

Return to list of courses

Course name: **Organizational Behavior**	
Course available with minimum number of 4 participants.	
Course code: ZL016	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Mazur-Włodarczyk Katarzyna, k.mazur-kajta@po.opole.pl	
Prerequisites: English (min B1 level), -	
Objectives of the course and learning outcomes: Understanding essence and the mechanism of organization behavior, their conditions and influence on organization and management	
Teaching program: Essence, internal and external conditions of organizational behaviors, authority and leadership at organization, conflict: interpersonal, internal and between groups, communication in organization, stress: reason, symptoms and methods to overcome the stress	
Assessment methods: On the basis of participation in discussions	
Recommended reading: S.R. Robbins, T.A. Judge, Organizational Behavior J.R., Jr Schermerhorn, J.G.Hunt, R.N. Osborn, Organizational Behavior M.A. Hitt, C.Ch. Miller, A. Colella, Organizational Behavior: A Strategic Approach	

Return to list of courses

Course name: **Project Management**	
Course available with minimum number of 4 participants.	
Course code: ZL017	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Klemens Brygida, b.klemens@po.opole.pl Szewczuk-Stępień Marzena, m.szewczuk-stepien@po.opole.pl	
Prerequisites: English (min B1 level), Theoretical preparation from other courses, i.e. Management	
Objectives of the course and learning outcomes: Students learn how to put projects into practise.	
Teaching program: - Glossary, - Definition and types of projects. - Basic parameters of projects. - Examples of big world projects. - Project life cycle. - Project initiation. - Organisation stuctures in projects execution. - Team selection and work division. - Methods of projects management. - Network technology. - Projects schedule. - Gantt’s graph. - Costs management. - Risk in project. Cases – examples of local authority projects.	
Assessment methods: - credit based on students participation in classes, - project, - practical tasks, activity	
Recommended reading: A Guide to the Project Management Body of Knowledge, PMI 2000.	

Return to list of courses

Course name: **Human Resources Management**	
Course available with minimum number of 4 participants.	
Course code: ZL018	**Form of class:** Lecture, Seminar,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Karaś Elżbieta, e.karas@po.opole.pl Mazur-Włodarczyk Katarzyna, k.mazur-kajta@po.opole.pl Polek-Duraj Kornelia, k.polek-duraj@po.opole.pl	
Prerequisites: English (min B1 level), -	
Objectives of the course and learning outcomes: The acquisition of basic knowledge in the field of human resource management, identification of possible HRM issues, development of skills in creating and managing team.	
Teaching program: During the course the following topics will be discussed: - Stages of development in human resources - Management models for human resources - Employee recruitment and selection - Employee integration - Employee motivation - Education and Training - Social interactions and their roles - Importance of interpersonal communication in a team	
Assessment methods: - actively participate in the discussion - the last test / the term paper are passed positively	
Recommended reading: - Armstrong`s Handbook of Human Resource Management Practice, Armstrong M., Taylor S., Kogan Page, 2014. - Human resource management in transition, edited by Pocztowski A., Wolters Kluwer, 2011.	

Return to list of courses

Course name: **Quality Management**	
Course available with minimum number of 4 participants.	
Course code: ZL019	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 7	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Karaś Elżbieta, e.karas@po.opole.pl	
Prerequisites: English (min B1 level), Knowledge of basic enterprise management	
Objectives of the course and learning outcomes: Preparing students to find ways of solving problems in area of quality management and to use basic methods and techniques.	
Teaching program: Introduction – theoretic basis of quality management Quality management methods used in enterprises Tools of quality improvement Quality management and standardization according to ISO series 9000 Standardization documentation Auditing and certification of quality management systems Practical implementation of quality management system Concept of quality costs A human aspect of quality management	
Assessment methods: Lecture and multimedia presentations, group discussions, case studies, preparing papers	
Recommended reading: Imai M.: Kaizen. The Key to Japan's Competitive Success, New York 2007 Hoyle D.: ISO 9000 Quality Systems Handbook, Oxford 2003 Liker J. K.: Toyota Way, New York 2003 Oakland J.: Quality Management, Oxford 2004	

Return to list of courses

Course name: **Information technology in management**	
Course available with minimum number of 4 participants.	
Course code: ZL020	**Form of class:** Lecture, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Wielki Janusz, j.wielki@po.opole.pl	
Prerequisites: English (min B1 level), Basics of management	
Objectives of the course and learning outcomes: C1 – understanding the notion of information system and its role in the functioning of business organizations, C2 – understanding the role information technology as important element of information systems, C3 – understanding the components of information technology, C4 – understanding the impact of information technology on changes taking place in the functioning of business organizations, C5 – understanding the challenges connected with information technology.	
Teaching program: Information systems and their role in the functioning of business organizations. Information technology as an important element of IS. The new role of information systems and information technology in organizations. Hardware infrastructure and system software infrastructure. Network infrastructure and the Internet. Internet technology-based tools and solutions. Security, ethical and social challenges connected with information technology utilization in organizations	
Assessment methods: lecture: exam-test, individual consultations, laboratory: active participation in laboratory.	
Recommended reading: 1.Laudon J., Laudon K.: Management Information Systems with MyMISLab. Har-low: Pearson Education, 2012. 2.Laudon J., Laudon K.: Management Information Systems. Upper Saddle River: Prentice-Hall, 2002.	

Return to list of courses

Course name: **Basics of Marketing**	
Course available with minimum number of 4 participants.	
Course code: ZL021	**Form of class:** Lecture, Seminar,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 7	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Adamska Małgorzata Patrycja, m.adamska@po.opole.pl Karaś Elżbieta, e.karas@po.opole.pl	
Prerequisites: English (min B1 level), Basics of management requirements: basic knowledge about organization; structure, functions and environment of organization	
Objectives of the course and learning outcomes: The most important goal of the subject is for students to understand the importance of a Marketing in the organization, its general concept and presence in life. Has the ability to recognize and implement the instruments of marketing within the enterprise; has the ability to think and act in rational and entrepreneurial way; has the ability to realize team and individual marketing tasks	
Teaching program: - Basic concepts of marketing - Marketing environment - Consumers and their behavior on the Market - Market segmentation - Product - Price - Promotion - Advertisement, Public relations - Distribution - Marketing Information System	
Assessment methods: one-choice test, activity during the lesson	
Recommended reading: Gary Armstrong,Michael Harker,Philip Kotler,Ross Brennan: Marketing: An Introduction Jerzy Altkorn, Basics of Marketing	

Return to list of courses

Course name: **Marketing Research**	
Course available with minimum number of 4 participants.	
Course code: ZL022	**Form of class:** Lecture, Laboratory,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 7	**Start date:** October, February
Number of hours per week: 4	**Number of hours per semester:** 60
Language of instruction: English	
Name of the lecturer and contact information: Szewczyk Mirosława, m.szewczyk@po.opole.pl	
Prerequisites: English (min B1 level), Marketing Basic	
Objectives of the course and learning outcomes: The course aims to study the process of marketing research. Students Student has to gain the knowledge about the problem definition, exploratory and descriptive research, data collection methods, designing the sample, data analysis and interpretation.	
Teaching program: Role of Marketing Research. Research Process. Problem Formulation. Research Design. Sampling and Nonsampling Errors. Measurement In Marketing Research. Primary and Secondary Data Collection. Sampling Procedure. Questionnaire Design. Data Analysis. Data Interpretation. The Research Report	
Assessment methods: Tasks, practice tests, discussion, individual and group projects. Case analysis.	
Recommended reading: Gilbert A. Churchill, Jr; Dawn Iacobucci, Marketing Research. Methodological Foundation, South Western Thomson Corporation, 2005	

Return to list of courses

Course name:
Finansy priedprijatji

Course available with minimum number of 4 participants.

Course code: ZL024/R	**Form of class:** Lecture, Seminar,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 7	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30

Language of instruction:
Russian

Name of the lecturer and contact information:
Sytnik Inessa, i.sytnik@po.opole.pl

Prerequisites:
English (min B1 level),
Imiet bazowyjie znanija osnow tieorji i mietodologii w ramkach swiazanych naucznych discyplin mikroekonomika, makroekonomika, finansy, menedżment. Obladat znanijem form, prawil, charaktierom miechanizmow funkcyonirowanija organizacji. Ponimat rol uprawlienija w sowriemiennoj finansowoj naukie.

Objectives of the course and learning outcomes:
Formirowanije sistiemy bazowych znanij po tieorii i praktikie finansowych otnoszenij subiektow hozjajstwowanija, formirowanija finansowych riesursow, finansowogo planirowanija, organizacji finansowoj i inwiesticyonnoj diejatielnosti priedprijatij.

Teaching program:
1. Wwiedienije w finansy priedprijatij – oblasti uprawlienijem priedprijatiem, cel, funkcyi i rol finansowogo menedżmenta, kriterii maksimalizacyi stoimosti priedprijatija (2 cz-lek, 2 cz – pr.z.).
2. Kratkostrocznyje i dolgostrocznyje istoczniki finansirowanija priedprijatija (2 cz -lek, 2 cz - pr.z.).
3. Prawowyje uslowija prieliecienija kapitala putiom wypuska ajcy i obligacyj na finansowom rynkie (2 cz -lek, 2 cz - pr.z.).
4. Dochody i raschody priedprijatija (2 cz -lek, 2 cz - pr.z.).
5. Pribyl i rientabielnost priedprijatija (2 cz -lek, 2 cz - pr.z.).
6. Osnowy finansowogo analiza (2 cz -lek, 2 cz - pr.z.).
7. Analiz finansowogo sostojanija priedprijatija (2 cz -lek, 2 cz - pr.z.).
8. Uprawlienije likwidnostju kompanii – suśćnost i rol oborotnogo kapitala (2 cz -lek, 2 cz - pr.z.).
9. Uprawlienije dienieżnymi sriedstwami, diebitorskoj zadołżenostju i towarno-matierialnymi zapasami priedprijatija (4 cz - lek, 4 cz - pr.z.).
10. Uprawlienije riskami priedprijatija (2 cz -lek, 2 cz - pr.z.).
11. Postojannyje aktiwy – princypy ocenki i uprawlienija (4 cz -lek, 4 cz - pr.z.).
12. Uprawlienije inwiesticyjami priedprijatija (4 cz -lek, 4 cz - pr.z.).

Assessment methods:
Położytielnaja ocenka testa (polucienije nie mienieje 50% ballow), zaciot prakticieskich zaniatij.

Recommended reading:
[1] Kowalow W,. W, Kowakow Wit . W. K56 Finansy organizacyj (priedprijatij): — M.: TK Weja-bi, Izdatielstwo Prospiekt, 2006.— 352 s. (http://www.al24.ru/wp-content/uploads/2013/02/ков_1.pdf)
[2] Solowjow W. I. Finansy priedprijatij i domasznich hozjajstw: Uciebnoje posobije. – M.., 2006. – 157 s. (http://visoloviev.ru/booksmath/FinKred2.pdf)
[3] Ekonomika i Finansy priedprijatija: Uciebnik pod red. T. S, Nowaszynoj. - M.:"Moskowskij finansowo- promyszliennyj uniwiersitiet "Sinergia", 2014 – 205 s. (http://fksevntu.ru/assets/files/novashina.pdf)

Return to list of courses

Course name: **Decision making processes in management.**	
Course available with minimum number of 4 participants.	
Course code: ZL034	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Dymek Łukasz, l.dymek@po.opole.pl Kazibudzki Paweł, p.kazibudzki@po.opole.pl	
Prerequisites: English (min B1 level), Knowlegde of principles of decision making process	
Objectives of the course and learning outcomes: Students learn how to use knowledge about decision making process in professional work and how to move into practise.	
Teaching program: New philosophy of management. Problems of enterprises. Prioriteis of problems' solutios. Problems' solutions and making of management conceptions. Reality in actions.Methods and technics of decision making process - theory. Methods and technics of decision making process – casus (practical actions). Acting in conditions of trust crisis. Place of manager in decision making process. Factors and barriers of decision making process.	
Assessment methods: -credit based on students participation in classes, -practical tasks, -activity.	
Recommended reading: Abelson, R.P.,	

Return to list of courses

Course name: **Innovation in Business**	
Course available with minimum number of 4 participants.	
Course code: ZL035	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Karaś Elżbieta, e.karas@po.opole.pl	
Prerequisites: English (min B1 level), Knowledge of basic enterprise management	
Objectives of the course and learning outcomes: Preparing students to find ways of solving problems in area of innovation management and to recognize types and models of innovation and technology transfers.	
Teaching program: Introduction – theoretic basis of innovation Innovation and creativity in enterprises Process of innovation in enterprises Knowledge, technological changes Sources of technological changes Innovation dynamics and the evolution of industries Technological changes Technology diffusion and technology transfer Innovation dynamics in the Word Economy	
Assessment methods: Lecture and multimedia presentations, group discussions, case studies, preparing papers	
Recommended reading: Imai M.: Kaizen. The Key to Japan's Competitive Success, New York 2007 Liker J. K.: Toyota Way, New York 2003 Prahalad C.K.: The New Age of Innovation, The McGraw-Hill 2008 Trott P.: Innovation Management and New Product Development, Prentice Hall, New York 2008	

Return to list of courses

Course name: **Production and Services Management**	
Course code: ZL036	**Form of class:** Lecture, Laboratory, Seminar,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Jurczyk-Bunkowska Magdalena, m.jurczyk-bunkowska@po.opole.pl	
Prerequisites: English (min B1 level), English (min B1 level), Basic knowledge of Marketing and Financial Management.	
Objectives of the course and learning outcomes: The aim of this course is to provide the students with a knowledge base on how to develop and run businesses more efficient. During the course the students will be introduced to terms, methods, and current research topics within the field of operation management. Although the main focus in the course is industry, almost all methods are general and therefore applicable in service trades like the hotel industry, consulting, hospitals, public services etc. Students will understand the principles and practice of factors which influence the capacity to compete effectively in manufacturing and service operations.	
Teaching program: The Production and Operations Function and the Organisation, Production/Operations Strategy, Planning and Controlling the Operations, Production/Operations Management Production/Operations Management in Manufacturing and Service Environments, Marketing and Product/Service Design, Product/Service: Variety and Value, Quality, Reliability, Product, Service, Operations and Competitive Strategies, Location and Design of the Plant or Facilities, Layout of the Facilities, Equipment Selection, Maintenance of the Facilities and Equipment, Production/Operation Systems Design, Work Measurement, Operations Control: An Introduction, Forecasting, Capacity Management and Operations Scheduling, Manufacturing Planning Case Study, Data Capture and Release, Inventory Management, Manufacturing Planning and Control Systems, Project Management, Resource Allocation – Linear Programming, Purchasing, Despatch.	
Assessment methods: Lecture – oral examination; seminary participation; laboratory completion of individual project assignments.	
Recommended reading: 1. Gideon Halevi: Handbook of Production Management Methods, Butterworth Heinemann, 2001; 2. Keith Lockyer, Alan Muhlemann, and J.S. Oakland: Production and Operations Management, Financial Times/ Prentice Hall; 3. Donald Waters: Operations Management. Producting Goods and Services Financial Times/ Prentice Hall (now 2th edition); 4. Eliyahu M. Goldratt and Jeff Cox The Goal: A Process of Ongoing Improvement, Gower Publishing Ltd; 5. Chase, Richard B. (2006). Operations management for competitive advantage. McGraw-Hill/Irwin; 11 edition; 6. David Ray Anderson Dennis J. Sweeney Thomas Arthur Williams (2008): An Introduction to Management Science: Quantitative Approaches to Decision Making, South-Western Educational Publishing.	

Return to list of courses

Course name: **Business Plan**	
Course code: ZL041	**Form of class:** Lecture, Project,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Dymek Łukasz, l.dymek@po.opole.pl	
Prerequisites: English (min B1 level), Fundamentals of management	
Objectives of the course and learning outcomes: Developing competences and gaining knowledge about preparation own business plan that will be used to start or run a business.	
Teaching program: Lectures Presentation of basic concepts and definitions related to a business plan. Environment, stakeholders, business models. Objectives and basic principles of creating a business plan. Constructing the basic concept business plan (business plan structure). Strategic analysis (essence, scope and use of strategic analysis, methods used in analysis). Macro-environment analysis using scenario methods, micro-environment analysis with using Porter's 5 forces, analysis of the company's potential - SWOT. Marketing plan using the 4P concept. Strategic plan, examples of company strategies. Organizational plan, human and material resources. Practices The essence of planning business ventures. Principles and methodological assumptions of a business plan. The structure of the business plan (content layout, basic elements, documents) and its stages preparation. Scope of the planned undertaking: idea - characteristics of the undertaking's profile and its purpose (short-term as well as long-term). Motives for establishing the enterprise and justification industry selection. Selection of the organizational and legal form of the business activity. Organization and management plan. Assumptions of the personnel policy - defining the demand on human resources. Marketing analysis (functional description of the product / services, recipients (customer profile). Building marketing strategy. Advertising/promotion of the enterprise. Product, pricing, distribution and communication policy. Competition and market entry barriers. Competitive advantage. PEST analysis, Porter's 5 force model and Lehmann force; SWOT analysis of the selected project. Risk factors/factors and sensitivity analysis. Profitability and economic efficiency of the project - costs of starting the project and sources of funding. Economic and financial feasibility (forecast of revenues from the planned activity); Bill profits and losses. Presentation of the draft business plan.	
Assessment methods: Passing the lecture on the basis of active participation in classes, preparation for the subject and written form. Assessment of the exercises is based on the project carried out during the classes, as well as the presence of activity of individual participants.	
Recommended reading: Clark T., Osterwalder A., Pingeur Y., Model Biznesowy TY, Helion, Gliwice 2016 Pijl P., Lokitz J., Solomon L.K., Nowoczesne projektowanie modeli biznesowych, Helion, Gliwice 2018 Bland D. J., Osterwalder A., Testowanie pomysłów biznesowych, Helion, Wiley, Gliwice 2021 Osterwalder A, Business Model Generation, John Wiley	

Return to list of courses

Course name: **Psychology of management**	
Course available with minimum number of 4 participants.	
Course code: ZM035	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Polek-Duraj Kornelia, k.polek-duraj@po.opole.pl	
Prerequisites: English (min B1 level), ---	
Objectives of the course and learning outcomes: The students will obtain a firm grounding in several basic areas of psychology and research methodology. Within the program, the student is expected to become competent in theory, research, and applications of psychology as they relate to management. The program emphasizes the contributions of psychology to the understanding of people in their world of work. Training is received in the conduct of basic and applied research, and in the applications of theory and research to organizational and human resource management problems in organizations.	
Teaching program: - Introduction to Psychology of Management - Employee Selection: Recruiting and Interviewing, References and Testing. Evaluating Selection Techniques and Decisions - Evaluating Employee Performance - Designing and Evaluating Training Systems - Employee Motivation - Employee Satisfaction and Commitment - Organizational Communication - Leadership - Group Behavior, Teams, and Conflict - Stress Management: Dealing with the Demands of Life and Work	
Assessment methods: Written exam	
Recommended reading: Michael G. Aamodt, Industrial/Organizational Psychology: An Applied Approach	

Return to list of courses

Course name: **Time management and personal development**	
Course code: ZM038	**Form of class:** Seminar,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Polek-Duraj Kornelia, k.polek-duraj@po.opole.pl	
Prerequisites: English (min B1 level), no prerequisites	
Objectives of the course and learning outcomes: Equipping students with multi-faceted knowledge of time management students should be able to: manage their own and subordinate team's work and manage their work time accordingly.	
Teaching program: Definition of problems and the most common causes of wasting time; Communication as a way to manage time; Conflict - as a factor "taking" time; Elements of time management: goal setting, planning, decision making, implementation, control; Time management methods and techniques. SWOT self-analysis. Time management and types of employees; Methods for planning your own career. Diagnosing time allocation on the example of one's life situation. Individual style of self management over time. Motivating for action; Delegation of tasks - rules, dangers; Procrastination - delaying matters - how to overcome it?; Work. The concept and functions of work in human life. The concept and essence of work management, management and leadership.	
Assessment methods: test paper examination, individual/group project paper report and/or presentation	
Recommended reading: 1.The Secret for being Mega-Effective by Achieving More in Less Time by Amit Offir 2. McKay; Brett; Kate (October 23, 2013). "The Eisenhower Decision Matrix: How to Distinguish Between Urgent and Important Tasks and Make Real Progress in Your Life". A Man's Life, Personal Development 3. Covey S.R., The 7 habits of highly effective people), Dom Wydawniczy Rebis, 2006.	

Return to list of courses

Course name:
Brand management

Course code: ZM048	**Form of class:** Project, Seminar,
Level of study: postgraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30

Language of instruction:
English

Name of the lecturer and contact information:
Adamska Małgorzata Patrycja, m.adamska@po.opole.pl

Prerequisites:
English (min B1 level),
Knowledge of the functioning of enterprise marketing
Knowledge about a man and his functioning in the organization
The ability of independently acquiring and developing knowledge
The ability of establishing relationships and communicating with the environment
Communication skills, ingenuity and creativity
Commitment to entrusted task

Objectives of the course and learning outcomes:
The aim of the course is to acquire knowledge and practical skills for the listener to manage the portfolio of brands. During the didactic process, students will also learn practical examples brand architecture, brand positioning and strategies used in this goal.

Teaching program:
Execution method:
with the use of audiovisual techniques from using PowerPoint.. Practical examples from market reality. Exercises requiring an active and independent participation work, focusing on the use of tools marketing in practical decision problems. Participation of listeners in classes. Discussion.

Content of Course:
The essence, identity and strength of the brand - the definition and essence of the brand, brand levels, brand identity, determinants of brand strength, brand's market success, benefits of having a strong brand for the owner and buyer
The process of introducing a new brand to the market - discussion of the stages of introducing a new brand into market
Brand name - definition and meaning of brand names, structure of the brand name, categories of brand names, the process of shaping a new name, a marketing slogan
"Brand architecture - individual brand, product line brand, brand of product range, brand-umbrella, brands of hybrids, practice of creating brand architecture"
Market position analysis and brand valuation - brand share in the market, brand image research, concept and valuation of the brand value, examples of the most valuable brands in the world and in Poland
Brands in retail - the essence of own hypermarket brands, their classification
Global brands - the essence, benefits of having global brands, adaptation and standardization, product categories susceptible to creating global and local brands, differences in perception of colors in the world, intercultural differences in advertising
Brand management in the marketing departments of domestic and global enterprises 2 10 Strategies for creating value for the buyer through services
Legal aspects of brand reservation - the procedure of brand reservation in Poland, in the European Union and third countries, documents, costs, the role of patent offices

The project of brand marketing communication
Assortment diversification design based on the well-known brand - product selection, services, drafting objectives and assumptions of the project
Research, analysis and evaluation of the image of the selected brand

Assessment methods:
Assessment methods (oral, written/test paper examination, individual/group project paper report and/or presentation, coursework, laboratory report, practical classes assessment,...):

Positive assessment of announced tests of knowledge during the semester – online on Moodle platform.
Average grade for completed projects. The evaluation of the exercises consists of the grades from the tasks completed on the exercises

Recommended reading:
Advanced Brand Management: Managing Brands in a Changing World Paul Temporal - 2011
https://books.google.pl/books?isbn=1118181581
Brand Management: A Theoretical and Practical Approach Rik Riezebos, H. J. Riezebos, Bas Kist - 2003
https://books.google.pl/books?isbn=0273655051
The New Strategic Brand Management: Advanced Insights and Strategic ... Jean-Noël Kapferer - 2012
https://books.google.pl/books?isbn=0749465166
Handbook of Public Relations edited by Robert L. Heath, Gabriel M. Vasquez
https://books.google.pl/books/about/Handbook_of_Public_Relations.html?id=BJgcPCvcZn8C

Return to list of courses

Course name: **Corporate Social Responsibility**	
Course code: ZM049	**Form of class:** Seminar,
Level of study: postgraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 1	**Number of hours per semester:** 15
Language of instruction: English	
Name of the lecturer and contact information: Edaich Said, s.edaich@po.opole.pl Polek-Duraj Kornelia, k.polek-duraj@po.opole.pl	
Prerequisites: English (min B1 level), n/a	
Objectives of the course and learning outcomes: : S/He knows and understands the importance of social responsibility business and points to its manifestations in practice, from taking into account the challenges of globalization processes; S/He has extended knowledge about the role of stakeholders in functioning of the organization; S/He has knowledge about scientific views and concepts, related to corporate social responsibility; S/he has knowledge of CSR dimensions and impact of CSR and organizations for modern economic systems; S/he defines and explains factors conditioning forms, principles, the essence and mechanisms of social responsibility in organizations; S/He understands the importance of CSR for cooperation and competition between enterprises and economic systems	
Teaching program: The idea of Corporate Social Responsibility and its genesis, Business responsibility in strategic terms. The concept of the Triple Bottom Line, Role of stakeholders in Corporate Social Responsibility, Areas of corporate social responsibility - social, environmental and economic, CSR models. Stages of Corporate Citizenship, Measurement of corporate social responsibility, CSR and Diversity Management, Corporate social responsibility and promotion and public relations, Communicating Corporate Social Responsibility. Communication through the Social media, CSR and strategic partnerships	
Assessment methods: test paper, individual project	
Recommended reading: 1.Chandler D. 2016, Strategic Corporate Social Responsibility: Sustainable Value Creation. 2. Chandler D., Werther W. B. 2013, Strategic Corporate Social Responsibility: Stakeholders, Globalization, and Sustainable Value Creation 3. Beal B. 2013, Corporate Social Responsibility: Definition, Core Issuesm and Recent Developments. 4. Crowther, D, Guler A., 2008, Corporate Social Responsibility. 5. Hohnen P., Potts J. (eds), 2007, Corporate Social Responsibility An Implementation Guide for Business	

Return to list of courses

Course name: **International Marketing**	
Course code: ZM050	**Form of class:** Lecture, Seminar,
Level of study: postgraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Łukaniszyn-Domaszewska Katarzyna, k.lukaniszyn-domaszewska@po.edu.pl	
Prerequisites: English (min B1 level), He knows the basic terminology in the field of management science and has knowledge of basic marketing tools.	
Objectives of the course and learning outcomes: The main objective of the course is to show the issues of contemporary marketing on foreign markets against the background of the processes of internationalization of enterprises. Specific objectives include: - presentation and analysis of the elements of the international environment of enterprises in the European context and presentation of the key success factors of business entities on international markets, presentation of marketing strategies implemented on international markets.	
Teaching program: The essence and scope of international marketing. Globalization and its measures. Strategies of enterprises entering foreign markets. Marketing research of foreign markets. Differentiation of buyers' behavior on international markets. Shaping the instruments of marketing mix on the market. international - Product on foreign markets. Concepts of the brand and product positioning on a contemporary basis. international market. Marketing communication on the international market. International promotion. International distribution. Prices in international marketing. Organization of international marketing in the company.	
Assessment methods: individual/group project paper report and/or presentation, coursework,	
Recommended reading: K. Fonfara. Marketing medzynarodowy, Warszawa, 2014 M. Komor. Euromarketing : strategie marketingowe przedsiębiorstw na eurorynku / Warszawa : Wydawnictwo Naukowe PWN, 2000. R.Paul. J. Kapoor : International marketing. The McGraw -Hill,company 2010 W. Grzegorczyk, Marketing na rynku medzynarodowym, Warszawa, 2013 A. Hauke-Lopes Marketing międzynarodowy : studia przypadków i zadania, Poznań : Wydawnictwo Uniwersytetu Ekonomicznego, 2013. A. Grzesiuk, Marketing Międzynarodowy, Ce De Wu, Warszawa 2007	

Return to list of courses

Course name: **Sales management**	
Course code: ZM054	**Form of class:** Project, Seminar,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Komańda Marcin, m.komanda@po.edu.pl	
Prerequisites: English (min B1 level), English (minimum B1 level)	
Objectives of the course and learning outcomes: Goal: To familiarize students with sales management issues and basic sales techniques. Learning outcomes: O1: S/He describes and explains a number of issues and definitions contained in the substantive framework of service sales techniques O2: S/He recognizes the essence of the processes of integration of communication and promotional activities O3: S/He detects the causes of a particular state of a given sales situation, can propose alternative solutions and determines the optimal one for it solution O4: S/he keeps open to various solution concepts problems posed for analysis during the exercises and cares about achieving the goals.	
Teaching program: - The role of sales and its relations with other functions in the enterprise - Formulation of sales strategies and plans - Basics of organization of the sales process in the enterprise - Organization of sales staff - Selected aspects of managing current operations of sales staff - The contorol of sales staff and sales department - Basics of statistical and qualitative methods of sales forecasting - Overviewing and discussing the practical aspects of sales: the exhibition of goods and merchandising, communication in the sales proces, self-presentation and image of the company in the sales process, prospecting, identification of needs - selected methods, closing techniques, complaints service, aspects of unethicity, opacity and misunderstanding in the sales process	
Assessment methods: individual project paper report	
Recommended reading: Virginia Evans, Jenny Dooley, Craig Vickers, Sales and Marketing, 2015 Daniel H. Pink, To sell is human, 2013 Aaron Ross, Predictable Revenue, 2011	

Return to list of courses

Course name: **Process Management**	
Course available with minimum number of 4 participants.	
Course code: ZMZP1_5	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Karaś Elżbieta, e.karas@po.opole.pl	
Prerequisites: English (min B1 level), Knowledge of basic enterprise management	
Objectives of the course and learning outcomes: Preparing students to find ways of solving problems in area of process management and to recognize types of process in enterprise and to use method of improvement them.	
Teaching program: The course will explain management systems and business process analysis, systems design and methods of implementation. It will provide a basic knowledge and understanding of how to design, test and implement systems for business process.	
Assessment methods: Oral and individual or group presentation	
Recommended reading: Davenport T. (1993). Process Innovation: Reengineering work through information technology. Harvard Business School Press, Boston. Hammer M., Champy J. (1993). Reengineering the Corporation: A Manifesto for Business Revolution, Harper Business Hammer M., Champy J. (2000). Reengineering – radical change of firm. Oxford: Management Press. Kaplan R.S., Norton D.P. (1996). The Balanced Scorecard. Boston: Harvard Business Press. Rummler G., Brache A. (1995). Improving Performance: How to manage the white space on the organizational chart. Jossey-Bass, San Francisco.	

Return to list of courses

Course name:
Marketing in Business

Course available with minimum number of 4 participants.

Course code: ZMZP1_6	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 4	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30

Language of instruction:
English

Name of the lecturer and contact information:
Adamska Małgorzata Patrycja, m.adamska@po.opole.pl
Wielki Janusz, j.wielki@po.opole.pl

Prerequisites:
English (min B1 level),

Objectives of the course and learning outcomes:
After completing the course the student will have the ability to recognize and implement the instruments of marketing within an enterprise; He/she will have the ability to think and act in rational and entrepreneurial way as well as realize marketing tasks. He/she will also have the knowledge regarding marketing, marketing strategies, and channels.

Teaching program:
- Marketing: Creating and Capturing Customer Value
- Company and marketing strategy: Partnering to Build Customer Value and Relationships
- Analyzing the marketing environment
- Managing marketing Information to Gain Customer Insights
- Understanding Consumer and Business Buyer Behavior
- Customer-Driven marketing strategy: Creating Value for Target Customer
- Products, services, and Brands: Building Customer Value
- New Product Development and Product life-Cycle strategies
- Pricing: Understanding and Capturing Customer Value
- Marketing Channels: Delivering Customer Value
- Retailing and Wholesaling
- Engaging Consumers and Communicating Customer Value: Advertising and Public Relations
- Direct, online, social media, and mobile marketing

Assessment methods:
Written exam

Recommended reading:
G. Armstrong, P. Kotler, Marketing – an introduction, 2015.

Return to list of courses

Course name: **Strategic Management**	
Course available with minimum number of 4 participants.	
Course code: ZMZP2_2	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 6	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30
Language of instruction: English	
Name of the lecturer and contact information: Dymek Łukasz, l.dymek@po.opole.pl Karaś Elżbieta, e.karas@po.opole.pl Kazibudzki Paweł, p.kazibudzki@po.opole.pl	
Prerequisites: English (min B1 level), The aim of the course is to provides an intellectually rich, yet thoroughly practical, analysis of strategic management concepts today and to give students a complete understanding of how today's businesses use strategic management to establish sustained competitive advantage	
Objectives of the course and learning outcomes: 1.Introduction to strategy management 2. Strategic Management and Strategic Competetivness 3. Strategy Formulation 4. Startegy Implementation 5. Corporate Governanve 6. Sustainability Development 7. Strategic Leadership	
Teaching program: Participation in discussion and case study preparation and analysis	
Assessment methods: Participation in discussion and case study preparation and analysis	
Recommended reading: Hitt M.A., Ireland R.D., Hoskisson R.E., Strategic Management: Concepts: Competitiveness and Globalization, South-Western College Pub, 2010. Dess G., Lumpkin A.T., Eisner A., Strategic Management: Creating Competitive Advantages, Mc Graw-Hill, 2009. David F.R., Strategic Management: Concept, Prentice Hall, 2010. Hitt M.A., Hoskisson R.E., R.D. Ireland, Strategic Management: Cases Competitiveness and Globalization, South-Western College Pub, 2010.	

Return to list of courses

Course name:
Commercial Law

Course available with minimum number of 4 participants.

Course code: ZMZP2_4	**Form of class:** Lecture, Group tutorial,
Level of study: undergraduate	**Duration:** 1 semester
Number of ECTS credits: 5	**Start date:** October, February
Number of hours per week: 2	**Number of hours per semester:** 30

Language of instruction:
English

Name of the lecturer and contact information:
Edaich Said, s.edaich@po.opole.pl

Prerequisites:
English (min B1 level),
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Objectives of the course and learning outcomes:
The course aims to give students theoretical knowledge sufficient to begin superior studies or to begin to professional life. The goal is to develop critical thinking and curiosity of students, enabling them to approach the rules and to analyze them with the basic knowledge required.

Teaching program:
Introduction: Brief history of commercial law
A - Definition and principles of commercial law
- Definition
- Commercial Law: law of merchants or law of commercial acts.
- Evolution of Commercial Law (Entrepreneurship Law), (business law).
- Principles of Commercial Law.
- The sources of commercial law: national sources, international sources, Custom, usage and self-regulation.
B - Commercial Transactions and the Concept Merchant.
- The acquisition and loss of merchant status.
- The legal capacity of the merchant.
- The rights and obligations of the merchant.
C - The Proof in Commercial Law.
D - Le “Fond de Commerce” (the Business),
- The sale and transfer of “fond de commerce”.
E - The commercial lease, (droit de bail).
F - Company Law.
- definition of Company.
- categories of companies.
- Company contract.
- Legal personality of company.
- The dissolution of the company.
G - The commercial contracts.
H - The Competition Law (concurrence) and consumer protection.
I – harmonization process of Commercial Law (UNIDROIT PRINCIPLES).

Assessment methods:
Lecture Activity performed using audiovisual techniques, supplemented by case studies, group work and discussions with students and encouraging them actively to engage in problem solving

Recommended reading:
1) Commercial Law.
Cavendish. 3 edition - Editor Routledge, 2002.
2) Commercial Law. Robert Bradgate, Fidelma White - Editor Oxford University Press, 2007.
3) Commercial Law. Robert Bradgate, Fidelma White - Edotor Oxford University Press, 2008.
4) Commercial Law.
Dobson, K. J. Reddy, Jo Reddy, 3 edition- Editor Routledge, 2003.
5) Commercial law. Jonathan Fitchen, 7 edition – Editor Taylor and Francis, 2010.
6) Commercial law
Albert H. Putney, - Editor Cree publishing company, 1909.
7) Commercial Law of the European Union. Gabriël Moens, John TroneTom. 4 z Ius Gentium, - Editor Springer, 2010.
8) commercial law: a manual of the fundamental principles governing business transactions

Return to list of courses