

ENGLISH SPEAKING COURSES

	Course	Description	ECTS
1	Project Management	This course develops the competencies and skills for planning and controlling projects and understanding interpersonal issues that drive successful project outcomes. Focusing on the introduction of new products and processes, it examines the project management life cycle, defining project parameters, matrix management challenges, effective project management tools and techniques, and the role of a project manager.	3
2	Mathematics	Higher algebra (determinants and matrix calculus). Mathematical analysis (overview of elementary functions, sequences, numerical series, functional series, limits of functions, differential calculus and its applications, elements of integral calculus.	6
3	Computer modeling of industrial processes	Presentation of main elements of physical processes modeling. Interpolation, approximation (introduction of the input data to the computer program), numerical differentiation, boundary and initial problems, finite difference method, examples of the method application in the designing process	3
4	Logic	Definitions of logic, scope of lectures, information about the history of logic, elements of semiotics, classical propositional calculus, bivalent logic, tautologies and counter-tautologies, inference, truth and logical falsehood	3
5	Heat transfer	Ways of heat transfer, heat conduction, Fourier law, steady and transient heat conduction (Fourier-Kirchhoff equation), the examples from the scope of engineering practice. Radiation, the basic laws,	5

		radiative heat exchange between surfaces, brightness balance. Convection, the Newton law, the ways of heat transfer coefficient in the case of natural and forced convection. Short information concerning the types and designing of heat exchangers	
6	Information technology	The aim of the course is to acquire proficiency in using office application: MS Word, MS Excel and MS Power Point as well as proficiency in using the selected services of the internet network such as: electronic mail or browsing the www resources	3
7	Chemical technology and industrial biotechnology	Within the framework of the subject the following topics will be presented: criteria of optimization of technological process, stages of designing new technology, selected technological processes (e.g.. petrochemical industry, plastic industry, plastic processing industry, sodium industry, sulphuric acid industry) and biotechnological processes (e.g. in medicine). Within the subject the students will prepare a technological project with the use of stoichiometric and thermodynamic measurements	5
8	Automation and robotics of production processes	The essence of the subject is presenting the basic elements of automation and robotics applied in industry. The aim of the subject is presenting to the students the theory connected with automation and robotics of industry as well as presenting advantages and disadvantages of the presented solutions	5
9	Informatics	Relational database. Building a relational database – Microsoft Access . Creating tables, queries, forms, macros and reports. Design of own database	3
10	Technical physics	Mechanical movement, frame of reference, movement, speed, acceleration, force, dynamics of material points, equations of movement, energy, momentum, laws of behaviour, dynamics of rigid body, rotation, angular velocity, inertia tensor, deformable bodies, elasticity, oblique, uniform motion in a circle, rules of Newton's dynamics, gravitation, gravitation field, Kepler's laws.	3

		Elements of partial physics and thermodynamics: hydrostatics and hydrodynamics, flow of non-viscous liquid, laminar and turbulent flow, Reynolds' number. Elements of optics, lasers, light properties, refraction and refraction coefficient, diffraction, light interference, lenses, image creation, spectroscopy, laser – principles of operation and types of lasers, coherence, light polarization, birefringence, twist of polarization plane and its analytic importance	
11	Physical threats in work environment	Electromagnetic radiation, noise in work environment, mechanical vibrations and shakes, visible radiation, ionizing radiation, dustiness in work environment, air quality in workplace	4
12	Advanced measurement technologies	Physical bases of laser functioning, properties of laser radiation, types of lasers. The rules of designing devices and measurement systems for special conditions (explosive atmosphere). Laser measurements of vibrations (laser and optoelectronic detectors, Doppler vibrometry). Optical methods of work environment control – measurements of the characteristics of ultraviolet radiation. Photoacoustic methods in the measurements of small gas concentrations and in the examination of explosiveness. Analysis of the technical state of machines and devices with the use of thermography and holographic interferometry. Optical methods of dustiness measurement, especially in work environment	3