VILNIUS TECH
International Relations Office

# COURSE DESCRIPTIONS – SPRING SEMESTER 2022


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| AIAIA19402 | AIRCRAFT GENERAL KNOWLEDGE: AIRFRAME | | 6 ECTS |
|---|---|---|---|
| **Lectures** - 36 hours/semester | **Practical works** - 12 hours/semester | **Consultations** - 4 hours/semester | **Individual work** - 108 hours/semester |
| **Course aim** | N/A – will be updated. | | |
| **Course description** | The course covers the studies declared to the general knowledge about the design and construction of the aircraft. During the course the students obtain the knowledge and abilities required for the safe operation and navigation of the aircraft. Moreover, the knowledge obtained during the course will help to prepare for the JAR-FCL1 exam on the topic: 021 - AIRCRAFT GENERAL KNOWLEDGE - AIRFRAME AND SYSTEMS, ELECTRICS, POWER PLANT, EMERGENCY EQUIPMENT, part - AIRFRAME seeking to obtain the private pilot license (PPL). To reach the goal knowledge and abilities related to the general design and construction, material and structural components, loads and loading combinations, as well as structural limitations and maintenance are provided during the course. | | |

| AIAIA19801 | UNMANNED AERIAL VEHICLES AND THEIR SYSTEMS | | 3 ECTS |
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| **Lectures –** 30 hours/semester | **Practical works** - 2 hours/semester | **Consultations** - 15 hours/semester | **Individual work** - 33 hours/semester |
| **Course aim** | To provide knowledge about autonomous aircraft and their systems, provide skills for searching and reviewing information on autonomous aircraft, to understand impact of autonomous aircraft on human activities and natural environment. | | |
| **Course description** | The course of Autonomous aircraft and systems provides knowledge of autonomous aircraft, control principles, applied technical equipment and software. | | |

| AISVA19402 | AVIATION ENGLISH 2: RULES OF RADIOTELEPHONY | | 3 ECTS |
|---|---|---|---|
| **Lectures –** N/A | **Practical works** - 36 hours/semester | **Consultations** - 2 hours/semester | **Individual work** - 42 hours/semester |
| **Course aim** | The aim of the module is to acquaint students with the proper procedures for conducting radio communications and to develop their vocabulary and pronunciation skills for transmission of messages in routine and non-routine situations. | | |

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| **Course description** | Aviation English 2 introduces students to rules of radiotelephony, vocabulary and terminology used in radio communications, pronunciation and transmission features of messages, the structure of ATC instructions and requirements for them, develops the skills of listening to and understanding of radiotelephony in standard and non-standard situations, as well as the skills of using standard phraseology appropriately. |

| AISVA19603 | AVIATION ENGLISH 4 | | 3 ECTS |
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| **Lectures –** N/A | **Practical works -** 24 hours/semester | **Consultations -** 2 hours/semester | **Individual work -** 54 hours/semester |
| **Course aim** | To learn speaking Aviation English up to the II level according to ICAO requirements. | | |
| **Course description** | Aviation English 4 increasing lexical and grammatical knowledge alongside with speaking and listening skills in the range of leaving the aerodrome traffic zone. | | |

| AISVA19801 | AVIATION ENGLISH 6 | | 6 ECTS |
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| **Lectures –** N/A | **Practical works -** 60 hours/semester | **Consultations -** 4 hours/semester | **Individual work** - 96 hours/semester |
| **Course aim** | To train language skills - grammar, lexis and pronunciation, to learn standard phraseology fluently and to use to apply language skills to non routine flight situations. | | |
| **Course description** | Aviation English 6 examines various flight phases, emergency and non routine situations, enabling students to develop their speaking, listening and comprehension abilities with complicated English language units. | | |

| AISVA19403 | FLIGHT FUNDAMENTALS | | 3 ECTS |
|---|---|---|---|
| **Lectures –** 24 hours/semester | **Practical works** - 12 hours/semester | **Consultations -** 2 hours/semester | **Individual work** - 42 hours/semester |
| **Course aim** | To learn the fundamentals of the flight, basics of the aircraft construction and its systems, to prepare for the later and more detailed studies. To familiarize with the pilot and air traffic roles and duties in an aviation field. | | |
| **Course description** | Fundamentals of Flight is an introductory course about the aircraft pilot and air traffic controller speciality. This course covers the basics of various subjects and their topics. During the course the basics of an aircraft control is introduced, general principles of various aircraft systems are explained, preflight preparations tasks, pilot and air traffic conttroller roles are introduced. Course covers the basics of the practical navigation and meteorology, legal aspects when flying in the Lithuanian airspace. | | |

| AISVA19401 | GENERAL NAVIGATION | | 6 ECTS |
|---|---|---|---|
| **Lectures –** 48 hours/semester | **Practical works -** 24 hours/semester | **Consultations -** 4 hours/semester | **Individual work -** 84 hours/semester |
| **Course aim** | To teach about the visual navigation and its fundamentals, various concepts and rules which are used during the flight and during the preflight preparation. | | |
| **Course description** | General navigation is the speciality subject for the pilots and air traffic controllers. General navigation covers preparation for visual and radio navigation flight and is intended to give knowledge about various navigational calculations, to perform navigation during the flight. During the course various navigation coordinate systems, maps projection techniques are studied. Students are introduced with the measurement units used in navigation, learn how to use navigation-logarithmic ruler, how to fill in the information into the flight plan. | | |

| AISVA19601 | METEOROLOGY | | 9 ECTS |
|---|---|---|---|
| **Lectures** – 60 hours/semester | **Practical works -** 24 hours/semester | **Consultations -** 6 hours/semester | **Individual work -** 150 hours/semester |
| **Course aim** | To give knowledge how meteorological elements and parameters influence on aircrafts flights, international, national requirements for meteorological flight documentation, weather reports forecasts then interpret and apply information to flight situation. | | |
| **Course description** | Aeronautical meteorology international standards and recommended practices. Meteorological service for international air navigation. The influence of meteorological conditions on aircrafts and helicopters flights with new normative documents taken into account the principles and techniques of meteorological provision of the aviation that more effective performance characteristics make flights safe, regular and economic. | | |

| AIAIM19201 | COMPUTER-AIDED ENGINEERING (CAE) | 9 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – N/A | **Consultations** – **4** hours/semester |
| **Laboratory works** – **30** hours/semester | **Individual work** - 176 hours/semester | |
| **Course aim** | To provide knowledge on backgrounds of Finite Elements Method, FEM based computational technology and application to engineering (incl. aerospace structures) problems. To get the ability and skills to practical application the FEM software. | |

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| **Course description** | Concept of finite element method. Definitions. Standard discrete system. Diskretization of continua. Interpolation functions. Two-dimensional elements. Three-dimensional elements. Thin walled elements. Non-linear and time dependent problems. Applications to aerospace structures. Data procession technologies. Elements types and discretization procedures. |

| AIAIM17195 | MASTER GRADUATION THESIS | 30 ECTS |
|---|---|---|
| **Preparation for evaluation** – 30 hours/semester | **Final thesis -** 770 hours/semester | |
| **Course aim** | Completion of the research work. Analysis and generalization of results. Preparation and defense of the prepared Master Thesis in order to substantiate that the obtained competence corresponds to the Aeronautical Engineering Master level. | |
| **Course description** | Completion of the research work preparation of Master thesis report. Analysis and generalization of the results. Preparation of the material the scientific conference (or a paper for a scientific journal). Preparation and defense of the prepared Master Thesis in order to substantiate that the obtained knowledge, experience and competence corresponding to the Aeronautical Engineering Master level. The prepared conference report or paper must be presented in an appendix of the Master thesis. | |

| AIAIM17188 | RESEARCH WORK 2 | 3 ECTS |
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| **Preparation for evaluation** – 10 hours/semester | **Research work -** 70 hours/semester | |
| **Course aim** | Analysis of theoretical methods and their application for the selected problem. | |
| **Course description** | Analysis of theoretical methods and their application for the selected problem. | |

| ARDIB16204 | DRAWING GRAPHICS ANT FONTS | | 6 ECTS |
|---|---|---|---|
| **Lectures** – 15 hours/semester | **Practical works** – 45 hours/semester | **Consultations** - 4 hours/semester | **Individual work** - 96 hours/semester |
| **Course aim** | The aim of this course is to provide students with knowledge and skills in the field of micro and macro typography and the means of graphic visualisation emphasizing their applicability and importance in industrial product design presentations. To develop and master the importance of font and content or product concept integrity and the potential of typographic tools. | | |
| **Course description** | ”Drawing graphics ant fonts” is dedicated to the first year students, the course contains of twofold parts of the knowledge and skills transfer: the theoretical part and course exercise part.<br>Theoretical lectures introduce students to the field of micro and macro typography and its significance in industrial product design, and the analysis of the design project presentations and composition principles.<br>The different typography tasks performed during the course exercise significantly supplement and consolidate the theoretical knowledge and develops skills of typography which are required in further study process in graphical representation of industrial product design projects. | | |

| ARDIB16602 | LIGHT COMMUNICATION AND MANAGEMENT | | 3 ECTS |
|---|---|---|---|
| **Lectures** – 24 hours/semester | **Practical works** – 12 hours/semester | **Consultations** - 2 hours/semester | **Individual work** - 42 hours/semester |
| **Course aim** | N/A – will be updated. | | |
| **Course description** | N/A – will be updated. | | |

| ARPGA17017 | AESTHETICS OF ARCHITECTURE | | 3 ECTS |
|---|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – N/A | **Consultations** - 2 hours/semester | **Individual work** - 48 hours/semester |
| **Course aim** | To get acquainted and master some of the most essential knowledge of aesthetics of architecture and develop an ability to use them in judging the phenomena, tendencies and works of architecture from aesthetics’ point of view. | | |

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| **Course description** | The course aims to acquiring the most essential theoretical knowledge and concepts of architecture - as an object of aesthetics; to educate the ability to comprehend and reflect upon some of the essential problems of architecture and their implications to judging architecture in practice; abilities to establish links between theoretical problems of architectural aesthetics and their application while interpreting architecture; the abilities to analyze philosophical texts critically. |

| ARPGA17018 | ARCHITECTURE RESEARCH METHODOLOGY | | 6 ECTS |
|---|---|---|---|
| **Lectures** – 20 hours/semester | **Practical works –** 20 hours/semester | **Consultations –** N/A | **Individual work** - 120 hours/semester |
| **Course aim** | To develop scientific research skills, foster scientific critical creative thinking and competence. | | |
| **Course description** | An introductory course surveying the basic methodologies of science and research methodes as they apply to the field of architecture. Acquired knowledge and competence will be helpful for the fulfilment of final work and for carrying out of scientific researches urgent in professional activity. | | |

| ARPGA19023 | BASICS OF BUILDING INFORMATION MODELING | | 3 ECTS |
|---|---|---|---|
| **Lectures –** N/A | **Practical works –** 30 hours/semester | **Consultations -** 2 hours/semester | **Individual work -** 48 hours/semester |
| **Course aim** | To introduce the basic principles of building information model (BIM) and its management requirements, using computer aided design systems. After completing this course will be able to read, understand and create building construction drawings. Will be able to manage the process of BIM life cycle and develop teamwork skills. | | |
| **Course description** | Building Information Modelling (BIM) application using engineering graphics software. Building information modeling computer software, and it's features for civil engineering. Parametric modeling of building elements and their descriptive information. Preparation of building three-dimensional models. Building element and construction detailing using building information modeling tools. Preparation of the drawings. Views arrangement in the drawings. Construction drawing. Material schedules and bill of materials. Building plan, section, elevation formation. BIM and CAD data management and standards. Plotting graphs and using them in documents. Project visualization, renderings and presentation. Team workflow in BIM projects. | | |

| ARPGA17005 | CONTEMPORARY ART PROJECT AND ARCHITECTURE | | 3 ECTS |
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| **Lectures –** N/A | **Practical works –** 45 hours/semester | **Consultations** - 2 hours/semester | **Individual work** - 33 hours/semester |
| **Course aim** | Comprehension of theoretical background and practice of contemporary art. The aim is to foster critical thinking and skills of innovative interdisciplinary artistic production as well as understanding of possibilities to apply it in rethinking of architecture and activation of urban public spaces. | | |
| **Course description** | Visual art module provides knowledge about relevant ideas and methods of contemporary art practice and supports students in the development and realization of the art project contextually and conceptually related to architecture. The emphasis of the module is on innovative multidisciplinary art practice with aesthetic and critical capacity to rethink social space. | | |

| ARPGA17003 | DRAWING 2 | | 6 ECTS |
|---|---|---|---|
| **Lectures** – N/A | **Practical works** – 60 hours/semester | **Consultations** - 4 hours/semester | Individual work - 96 hours/semester |
| **Course aim** | To train perception of space and to develop free hand drawing skills as means to record and express the construction, proportions, character and atmosphere of spatial forms - buildings, interior and exterior views and imaginary spaces. | | |
| **Course description** | Visual art module provides knowledge and skills of graphic representation of spatial forms by exercising sketch, study and interpretation types of free hand drawing. The ability to represent construction, proportions, character and atmosphere of spatial and volumetric forms, architectural objects and spaces are developed by drawing buildings, interior and exterior views and imaginary spaces. The problems of assignments progress from the representation of what is seen, to the conveying of personal perception of space and representation of imaginary spaces. Mastering of the use of various means of drawing - graphite, charcoal, ink. | | |

| ARPGA17012 | HISTORY AND COMPOSITION OF LITHUANIAN ARCHITECTURE | | 6 ECTS |
|---|---|---|---|
| **Lectures –** 30 hours/semester | **Practical works –** 30 hours/semester | **Consultations** - 2 hours/semester | **Individual work** - 98 hours/semester |
| **Course aim** | Presentation of the architectural styles in Lithuania, analysis of local peculiarities of architectural and urban planning development in Lithuania from the earliest period to the end of the 20th c. To master the method of structural analysis, while studying the composition of historic building and to give the ability to apply the results of analysis for creative work. | | |

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| **Course description** | The discipline consists of two parts: theoretical and practical. During the lectures, the peculiarities of Lithuanian architecture are revealed in every historic period of its development. The typical and unique features of Lithuanian Pre-Gothic, Gothic, Renaissance, Baroque, Classical, vernacular architecture, urban planning and cultural landscape formation traditions are analyzed. During the workshops and practical classes the historical architectural object is studied according the structural analysis method, and the causality of the building composition, structure, properties. is highlighted. The results of the study is used for the creation of the abstract artistic spatial composition. |

| ARPGA17010 | HISTORY OF ARCHITECTURE 1 | | 3 ECTS |
|---|---|---|---|
| **Lectures –** 30 hours/semester | **Practical works –** N/A | **Consultations -** 2 hours/semester | **Individual work -** 48 hours/semester |
| **Course aim** | To get acquainted with architectural features and contexts from the oldest civilizations to the end of the 19th century, to provide skills to analyze their causes and interactions. | | |
| **Course description** | This course transverses through the development of Western architecture from its prehistoric origins to the end of the 19th century. Along the study of architectural forms, a great emphasis is given to a particular context and reasons that contributed to the development of styles. This course introduces to the fundamental writings on architecture that shaped it then and in the centuries that followed. The lectures include examples of Lithuanian architecture, and bring the fundamental events within the history of landscape architecture. Short weekly reading and short writing are required. Exam contains written/oral and drawn tasks. | | |

| ARPGA17015 | HISTORY OF URBAN FORM AND COMPOSITION | | 6 ECTS |
|---|---|---|---|
| **Lectures –** 30 hours/semester | **Practical works –** 30 hours/semester | **Consultations -** 2 hours/semester | **Individual work -** 98 hours/semester |
| **Course aim** | The aim of urban form history is to help the intended architects to understand the formation of surroundings and corresponding professional activity as the historical, evolutionary phenomenon. The module should give the basics of knowledge, necessary for the professional activity, directly or indirectly touching the field of cultural heritage. The Urban Composition course aims at the following: to provide students with theoretical knowledge and basic practical experience about a city as the pro. | | |
| **Course description** | The evolution of the permanent settlements is presented in the first part of the course (Urban history). The peculiarities of Physical and functional organization and the influencing factors (evolution of the worldview, social, economical changes, condition of nature) are analyzed. The relations between the historical knowledge and professional culture are discussed to. Taking the course of Urban Composition students are introduced to the | | |

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| | key elements of urban structure, theories of its analysis, principles and instruments of urban space formation as an object of artistic creation, as well as their application possibilities in creative practice. |

| ARPGA17024 | PROTECTION OF IMMOVABLE CULTURAL HERITAGE | | 6 ECTS |
|---|---|---|---|
| **Lectures –** 45 hours/semester | **Practical works –** 15 hours/semester | **Consultations -** 4 hours/semester | **Individual work -** 98 hours/semester |
| **Course aim** | Training of expert abilities of students in the field of contemporary problems of immovable cultural heritage protection. To provide the knowledge on the identification of the architectural styles of the objects of the architecture and the ability to apply them. | | |
| **Course description** | Protection requirements of architectural heritage buildings, their complexes, sites, and cultural landscape, are presented, interrelation of their evaluation and treatment with problems of urban development are analyzed. The principles of safeguarding, established by international, foreign and Lithuanian cultural heritage protection documents and projects, are revealed. The targets of recording and preservation of buildings and sites under restoration or rebuilding are analyzed in situ. The development of the structural elements of the architectural styles and their architectural forms is analyzed through the resources of iconography and historiography as the fundamentals for the identification of the architectural styles. | | |

| ARPGA17016 | PSYCHOLOGY AND ETHICS IN ARCHITECTURE | | 3 ECTS |
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| **Lectures** – 30 hours/semester | **Practical works –** N/A | **Consultations -** 2 hours/semester | **Individual work -** 48 hours/semester |
| **Course aim** | To convey general knowledge on interaction between the realms of architecture and psychology, considering the psychological specificity of architect's activity. To get acquainted with the general concepts of ethics and with special notions of architectural ethics, with general and special ethical obligations of the architect. | | |
| **Course description** | Cognitive experience of interaction between architecture and psychology in historical and contemporary perspective. Psychological characteristics of architect's activity, general laws, conditions and principles of designing creativity. Psychological aspects of visual - graphic arsenal of architectural design; psychological characteristics of shape-space forms; preconditions for formation of architectural reasoning; interaction of architectural environment and human behaviour. General notions of ethics. Special questions of architectural ethics. General ethical obligations (seeking improvement of professional knowledge and skills, respect for human rights). Ethical obligations towards public society and state (prudent use of national resources and safeguard of cultural heritage); towards purchaser of services, towards own profession (uphold the integrity and dignity of the profession); towards colleagues (acknowledging the professional aspirations and contributions of colleagues). | | |

| ARPGA17025 | THEORY OF CITY CULTURE AND ARCHITECTURAL CRITICISM | | 6 ECTS |
|---|---|---|---|
| **Lectures –** 60 hours/semester | **Practical works –** N/A | **Consultations -** 4 hours/semester | **Individual work -** 96 hours/semester |
| **Course aim** | To get acquainted with the development of most essential historical problems of the city culture and their reflections in theoretical literature as well as acquiring an understanding of the most recent concepts of city making and revitalizing its culture. To introduce specificity of architectural criticism and its forms and genres of its expression as well as its theoretical foundations. The principles of writing a critical text focused on architectural phe-nomenon or tendency are discussed. | | |
| **Course description** | City culture in theory: the origins of city, the role of ancient founding rituals and place. Cultural premises for historical development of cities. Ideal and utopian models of the city as responses to the urban controversies and crises. Conceptions of city culture in modern epoch and urban literature: writings of P.Geddes, C.Sitte, le Corbusier, F.L.Wright, L.Mumford, J.Jacobs, C.A.Doxiadis, etc. The development and role of urban public places in the life of a city. New models of citymaking and city culture: consuming, green, sustainable, creative city, etc. The connection between architectural criticism and criticism of other arts as well as its differences is discussed. Specificity of architectural criticism ant its theoretic foundations are emphasized. Aesthetic, social and cultural roles of architectural criticism is discussed. Types and genres of architectural criticism are studies as well as forms and methods of critical analysis and interpretation. | | |

| ARARA17005 | ARCHITECTURE AND TECHNOLOGY | | 15 ECTS |
|---|---|---|---|
| **Lectures** – 75 hours/semester | **Practical works** – 120 hours/semester | **Consultations -** 10 hours/semester | **Individual work** - 195 hours/semester |
| **Course aim** | To acquire the object of architecture integrated design approach to understanding and appreciating the artistic and technological knowledge and skills to apply them to the importance of high-quality, sustainability-based architecture artistic expression. | | |
| **Course description** | Course content is based on the architectural design of the building and technological solution to complex issues, the development of a multistory (residential and public) facility project in a real urban environment. The module consists of three blocks of different subjects, tutored individual university departments: - Residential building conceptual architectural and reduced technical- work project (main Department- Architectural); - Residential buildings, mechanical stability, structural systems and materials, fire safety (Faculty of Civil Engineering Department); - Building energy and HVAC systems (buildings Energy Department); Module separate subjects exercises are practical capacity-building complex in architectural designing process. | | |

| ARURA16006 | ARCHITECTURE AND HERITAGE | | 15 ECTS |
|---|---|---|---|
| **Lectures** – 15 hours/semester | **Practical works** – 75 hours/semester | **Consultations** - 10 hours/semester | **Individual work** - 300 hours/semester |
| **Course aim** | Architect professional abilities to regenerate the urban fabric and renovate the existing buildings, taking in to account the evaluation of historically developed urban structure, values of architectural objects and different social need are educated. | | |
| **Course description** | The combination of theoretical knowledge and practical workshops are addressed to solve the regen-eration of urban structures and building renovation tasks. The abandoned or devoured blocks of the towns' central parts as well as the conversion industrial areas or the Soviet residential areas waste-lands are selected for the course project. The aim of the projects urban design part is a new urban design quality of the historic environment and harmony without violation of the existing or new spa-tial structure creation in wasteland. The aim of the project architectural part is - a renovation project of a real building in the present situation, which is being prepared in consideration of the existing property values and new social, artistic and technical requirements arising during the renovation process. | | |

| ARURA17003 | URBAN STRUCTURES | | 15 ECTS |
|---|---|---|---|
| **Lectures** – 45 hours/semester | **Practical works** – 150 hours/semester | **Consultations** - 10 hours/semester | **Individual work** - 195 hours/semester |
| **Course aim** | To provide students with knowledge necessary for understanding of contemporary urban development processes (trends and challenges) and solving complex urban design and planning tasks, as well as to develop professional skills in the fields of urban analysis, urban design and planning. | | |
| **Course description** | Students are familiarized with the process of urban development, as well as methodology and princi-ples of integrated urban development. Practical work is composed of successive tasks which develop professional skills in the fields of urban analysis, urban planning and urban design. Urban analysis of selected small Lithuanian town is performed and findings are summarized. After assessment of the quality of town's urban structure, alternative urban growth models are prepared, combining po-tential of external and internal development opportunities. Selected urban model is further developed into urban concept, unfolding major proposals for modernizing of urban structure and sustaining spatial identity of the town. Later detailed urban design solutions for the site in the central part of the town are prepared. | | |

| VVTVB17272 | BUSINESS PROJECTS (WITH COURSE WORK) | | 6 ECTS |
|---|---|---|---|
| **Lectures –** 30 hours/semester | **Practical works –** 30 hours/semester | **Consultations -** 4 hours/semester | **Individual work -** 98 hours/semester |
| **Course aim** | To provide theoretical and practical knowledge about business projects, their concepts, classification, the variety of project life cycles, the peculiarities of jobs performed in separate project phases, project research performance methodologies, their application peculiarities for separate business projects, to provide knowledge on project research conducting, investment and production cost estimation, evaluation of particular project with regard to financial, economic and social aspect. | | |
| **Course description** | This subject analyses business projects, their types, project life-cycles, job peculiarities performed in the separate phases of the project, project research (feasibility study) performance methodologies. The order of project research performance is analysed in details, discussing the jobs necessary to perform in every department in order to implement the project, as well as the resources required for these jobs. The sequence of project financial analysis performance is investigated, as well as financial, economic, social and efficiency indicators, risk and uncertainty analysis, risk evaluation methods and ways of risk diminishing. The peculiarities of project preparation and evaluation are analysed with regard to achievement of financial support from EU structural funds. | | |

| VVTVB17184 | ENGINEERING PRINCIPLES | | 3 ECTS |
|---|---|---|---|
| **Lectures –** 30 hours/semester | **Practical works –** 15 hours/semester | **Consultations** - 2 hours/semester | **Individual work -** 33 hours/semester |
| **Course aim** | To provide knowledge of engineering science and practice of the essence and significance, to assess the capacity of engineering facilities, products, processes, innovative development. | | |
| **Course description** | Engineering Principles course presents Engineering science, practices and products (goods, services, processes, core, value, place of education and economic systems). All types of technologies and materials are discussed: High-technology engineering; traditional and renewable sources of energy and heat engineering, electrical, computer engineering; Modeling, design, construction of architecture, transportation. Environmental and land management, ecology, and other engineering processes; Engineering staff, management strategies, economic and managerial aspects, standards, quality, and reliability. Natural resources, water, raw materials, aggregates materials, metals, polymers, ceramics, composites, and other innovative materials, their classification, receiving, structure, properties, rational use, waste, ecological recovery. | | |

| VVTVB17087 | ENTREPRENEURSHIP (WITH COURSE WORK) | | 6 ECTS |
|---|---|---|---|
| **Lectures –** 30 hours/semester | **Practical works –** 30 hours/semester | **Consultations** - 4 hours/semester | **Individual work** - 96 hours/semester |
| **Course aim** | To provide integrated system of theoretical and practical knowledge of entrepreneurship, which would allow students to orient themselves better in national and international environment while incepting and developing business companies. Knowledge of entrepreneurship would let to solve urgent management and economic issues in order to maintain performance sustainability and efficiency of business companies. | | |
| **Course description** | Entrepreneurship as learning subject provides possibility for students to obtain economic, managerial, and sociologic (theoretical and practical) knowledge about inception and development of enterprises. A wide spectrum of theoretical and practical approaches towards specifics of contemporary business: recognizing and evaluation new opportunities, designing business models, choosing financing sources and predicting modes of business closing. Various types of organizations, their alliances, business growth specifics in Europe and USA are being considered. | | |

| VVTVB19801 | INFORMATION MANAGEMENT SYSTEMS | | 3 ECTS |
|---|---|---|---|
| **Lectures –** 24 hours/semester | **Practical works –** 16 hours/semester | **Consultations** - 2 hours/semester | **Individual work** - 38 hours/semester |
| **Course aim** | To prepare business intelligence specialists with integrated business analitics knowledge, able to integrate ICT, information systems, quantitative and qualitative analytical and research methods, integrate economic, information technology and management theories into their professional activities in search of practical solutions for the analysis, evaluation and forecasting of company activities taking into account changes and perspectives of the external and internal environment. | | |
| **Course description** | The concept of informaction management systems (IMS) and their support in diferent management layers. Information and Communication technologies (ICT). Business Management Systems, their classification. Information Management Systems, their impact on business: competitiveness, organizational management structure, corporate culture. Integrated management information systems. Information Management Systems development, planning and organization. | | |

| VVTVB17173 | LOGISTICS | | 6 ECTS |
|---|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 30 hours/semester | **Consultations** - 4 hours/semester | **Individual work** - 96 hours/semester |
| **Course aim** | To prepare Bachelors of Business Management who would have integrated knowledge of business logistics management and knowledge related to other professional activity and be able to apply general and special abilities of business planning, organising, coordination and implementation in the private and public sector and to use them constructively in wide range of professional activity, to create and develop business, to be prepared for constant improvement through lifelong learning. | | |
| **Course description** | During the course, the concept and tasks of contemporary logistics are analysed, the place in the life of enterprise and society is described. Such aspects of logistics as client service, order processing, organization of transportation, inventory and warehouse management as well as management of material flows are introduced and relations between these aspects are analysed. | | |

| VVEIB17201 | ECONOMICS OF PUBLIC SECTOR (WITH A COURSE WORK) | | 6 ECTS |
|---|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 30 hours/semester | **Consultations** - 4 hours/semester | **Individual work** - 96 hours/semester |
| **Course aim** | To provide basic knowledge about the principles of public sector economy and the practical problems of it's functioning and to train facilities and to assess the key issues of public sector economy. | | |
| **Course description** | The Economics of Public Sector familiarizes with the public sector role in the economy, public sector structure and key levers of economic management - fiscal and social policy, issue of State's finance, State's revenue and expenditure policy, unemployment, employment, labour market policy, social exclusion, social security and health security, the financing of education, job, it's remuneration and efficiency, analysis of socio-economic processes efficiency. | | |

| VVEIB19880 | EU ECONOMIC POLICY | | 3 ECTS |
|---|---|---|---|
| **Lectures** – 24 hours/semester | **Practical works** – 16 hours/semester | **Consultations** - 2 hours/semester | **Individual work** - 38 hours/semester |
| **Course aim** | To provide knowledge about the principles of the formation of the EU economic policy and the possibilities of its implementation, to develop the ability to systematically examine the EU documents and databases and to make proper use of the opportunities created in the EU single market. | | |

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| **Course description** | The subject of EU economic policy is designed to examine the EU's economic priorities, policy development and implementation practices. While studying the subject students analyze the experience and achievements of the EU common economic space, examine the economic goals of policies pursued in various fields (business, environment, energy, education and research, transport, taxation, social and health affairs, agriculture);as well as the tendencies and directions of the formation of the EU regional policy, the EU budget and monetary policy and the EU structural funds are studied. |

| VVEIB20601 | INTERNATIONAL ECONOMICS | | 3 ECTS |
|---|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 15 hours/semester | **Consultations** - 2 hours/semester | **Individual work** - 33 hours/semester |
| **Course aim** | Preparation of professionals able to holistically understand and analyze the international economy, its evolution and developmentprocesses. The professionals will be able to offer management solutions according to the context and challenges of internationaleconomics. | | |
| **Course description** | During the course of International Economics the following scientific areas are explored: concept development of moderninternational economics; variety of international economics theories and their application; main sectors of international economicsand their peculiarities; specific phenomenon of international economics; international business; conception of internationalbusiness; international trade; international finance; direct foreign investment; international economic co-operation; countries andinternational organizations role in regulating the international economics, markets, competition, national economics; challenges ofinternational economics development; global economics, its challenges and priorities for development. | | |

| VVEIB17191 | MACROECONOMICS | | 6 ECTS |
|---|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 30 hours/semester | **Consultations** - 4 hours/semester | **Individual work** - 96 hours/semester |
| **Course aim** | To provide students with the basic knowledge in macroeconomics and with competences to identify them and to apply in the practice. | | |
| **Course description** | During the course of Macroeconomics the following issues are analysed: national product, its structure and volume; aggregated supply, aggregated demand and factors influencing them; recession, inflationary phase and business cycles; fiscal and monetary policy and tools and measures for their implementation; unemployment and inflation; economic growth, international trade and its policy. | | |

| VVEIB17801 | MICROECONOMICS | | 6 ECTS |
|---|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 30 hours/semester | **Consultations** - 4 hours/semester | **Individual work** - 96 hours/semester |
| **Course aim** | Develop an economic way of thinking: the micro-economic laws and their perception of performance, the ability to analyze and assess the various economic entities operating conditions, mechanisms and influencing environment, to apply the acquired knowledge into practice. | | |
| **Course description** | Microeconomics course examines households, businesses, industries and other independent decision-making activities of economic entities in the various economic systems and market structures, resources and income distribution problems, i.e., allocations of scarce resources to meet the alternative, competing public and business needs. | | |

| VVEIB17027 | REGIONAL ECONOMICS II: CHINA | | 3 ECTS |
|---|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 15 hours/semester | **Consultations** - 2 hours/semester | **Individual work** - 33 hours/semester |
| **Course aim** | To prepare specialists, which are able in complexity to understand and analyse economical development trends and perspectives in various world regions, specifically in China and able to prepare and implement concrete international projects for development of economical relations with this region. | | |
| **Course description** | Regional economics II: China course is introducing in details with various economical sectors, culture, science and technology advancement and political development features, also international economical relations specific for China. China is important world region, which is specifically important for development of international economical relations and cooperation in culture, science and study areas. Prioritised attention is given to perspectives of international trade and investments development, also overall perspectives of region economical potential, economical situation and economical development perspectives, also for studies of regional history, culture and political development topicalities. During the studies, concrete possibilities are analysed, for preparation and implementation of international projects for development of international relations with this region. | | |

| VVEIB17029 | REGIONAL ECONOMICS II: NORDIC COUNTRIES | | 3 ECTS |
|---|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 15 hours/semester | **Consultations** - 2 hours/semester | **Individual work** - 33 hours/semester |
| **Course aim** | To prepare specialists, which are able in complexity to understand and analyse economic development trends and perspectives in various world regions, specifically in Nordic countries and able to prepare and implement concrete international projects for development of economical relations with this region. | | |

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| **Course description** | Regional Economics II: Nordic Countries course is introducing in details with various economic sectors, culture, science and technology advancement and political development features, also international economic relations specific for Nordic countries. Nordic countries is important world region, which is specifically important for development of international economic relations and cooperation in culture, science and study areas. Prioritised attention is given to perspectives of international trade and investments development, also overall perspectives of region economical potential, economic situation and economic development perspectives, also for studies of regional history, culture and political development topicalities. During the studies, concrete possibilities are analysed, for preparation and implementation of international projects for development of international relations with this region. |

| VVFRB19809 | BEHAVIORAL FINANCE | | 6 ECTS |
|---|---|---|---|
| **Lectures** – 32 hours/semester | **Practical works** – 16 hours/semester | **Consultations** - 4 hours/semester | **Individual work** - 108 hours/semester |
| **Course aim** | To provide students with knowledge about the development of financial behavior theories, to train them to identify the models of individual people financial behavior and to take rational financial decisions. | | |
| **Course description** | The course of behavioral finance analyses peculiarities of financial and investment decisions with regard to human psychology and emotional factors. The relationship of psychology and finance, the impact of investors' psychology on the processes in financial markets is analysed. Students get information about the main financial motives of individuals: having cash, protection, money accumulation and asset management. The theories explaining financial behaviour of people are analysed: John M. Keynes' absolute income hypothesis, Franco Modigliani and Richard Brumberg life cycle hypothesis, Milton Friedman's permanent income hypothesis. Students learn to distinguish and assess the cognitive biases. Using the provided knowledge and skills, students learn to take rational financial and investment decisions in different life cycle stages and to ground their selection. | | |

| VVFRB16401 | CORPORATE FINANCIAL MANAGEMENT | | 6 ECTS |
|---|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 30 hours/semester | **Consultations** - 4 hours/semester | **Individual work** - 96 hours/semester |
| **Course aim** | To provide knowledge to students with key issues in enterprise finance related to the company's finance management objectives and condition assessment principles, credit and equity securities value, return and risk evaluation principles. Also, students will know more about investment, financing, profit-sharing and other principles of financial decisions adopted in companies and their impact on the company's value. | | |

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| **Course description** | Enterprise financial management course developed with the knowledge and skills required for the financial management problems specify. Learns to perform a systematic analysis of their existing knowledge of financial management in an effective corporate strategy and tactical action plans, identifying financial risks in managing cash flow and increasing the value of the company. Learn to model and predict the long-term and short-term asset management situations, funding policies and the development of financial business solutions to companies located in different stages of development and operating in different size markets. |

| VVFRB16607 | COURSE PROJECT OF FINANCIAL ANALYSIS | | 3 ECTS |
|---|---|---|---|
| **Lectures** – N/A | **Practical works** – 30 hours/semester | **Consultations** – N/A | **Individual work** - 30 hours/semester |
| **Course aim** | To provide theoretical and practical knowledge about role of financial analysis in financial engineering and management system, about its essence and fundamentals. To provide theoretical and practical knowledge about application of financial analysis methods, interpretation and summary of their results. To provide abilities to evaluate and absorb results of financial analysis and their importance in enterprises preparing the evaluation of absolute and relative financial ratios. | | |
| **Course description** | Purposes, sources and methods of financial analysis. Absolute and relative ratios. Ways of evaluation, comparison and forecasting of financial results. Methods of analysis of enterprises' financial condition, creditworthiness, operations. | | |

| VVFRB20601 | FINANCIAL ANALYSIS | | 6 ECTS |
|---|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 30 hours/semester | **Consultations** – 4 hours/semester | **Individual work** - 96 hours/semester |
| **Course aim** | To provide theoretical and practical knowledge about role of financial analysis in financial engineering and management system,about its essence and fundamentals.To provide theoretical and practical knowledge about application of financial analysismethods, interpretation and summary of their results.To provide abilities to evaluate and absorb results of financial analysis andtheir importance in enterprises preparing the evaluation of absolute and relative financial ratios. | | |
| **Course description** | Purposes, sources and methods of financial analysis. Absolute and relative ratios. Ways of evaluation, comparison andforecasting of financial results. Methods of analysis of enterprises' financial condition, creditworthiness, operations. | | |

| VVFRB16606 | FINANCIAL MARKETS AND INSTITUTIONS | | 3 ECTS |
|---|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 2 hours/semester | **Individual work** - 33 hours/semester |
| **Course aim** | To provide with theoretical and practical knowledge about the structure of financial institutions, peculiarities of money and capital markets, basic types of securities, their characteristics and ratios, the role of financial institutions in the economy. To endow ability to assess processes in financial markets, summarise results and to make economically reasonable investment decisions. | | |
| **Course description** | The course Financial Markets and Institutions deals with the structure of contemporary financial institutions, their peculiarities, role in the economy, process of financial intermediation, basic instruments of money and capital markets, the theory of interest rate. | | |

| VVFRB19806 | FINANCIAL RISK MANAGEMENT | | 6 ECTS |
|---|---|---|---|
| **Lectures** – 32 hours/semester | **Practical works** – 16 hours/semester | **Consultations** – 4 hours/semester | **Individual work** - 108 hours/semester |
| **Course aim** | To provide students with theoretical and practical knowledge about financial risks and their management, also to provide students with complex knowledge about risk assessment instruments, methods and models and train students to apply them. | | |
| **Course description** | The course of financial risk management analyses financial risks and their management in financial institutions, as well as in other companies and organizations. A lot of attention is given to separate types of risks, such as market risk, liquidity risk, credit risk and operational risk. The sources of these risks, as well as their management possibilities and processes are analysed. Students get information about risk assessment models and learn to apply them to assess risk in bank or other credit institution. The relationship of risk management process with the strategy of financial institution is analysed. Also it is studied what financial risks are encountered by non-financial organizations and how they can be managed. | | |

| VVFRB17603 | INTERNATIONAL FINANCE | | 3 ECTS |
|---|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 2 hours/semester | **Individual work** - 33 hours/semester |
| **Course aim** | The aim of the course is to teach students to understand the principles of functioning of the multinational financial system, its importance, benefits and risks, development trends, the role of the multinational finance managing the cross-border financial flows, be able to valuate the currency exchange rate fluctuation factors and trends, understand corporate cross-border investments and investment into the financial markets and fundamental and technical methods for such investment valuation. | | |

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| **Course description** | Multinational Finance course analyses the principles how the international financial systems function, its importance, benefits and risk, as well as discloses its development trends, the role of the multinational finance managing the cross-border financial flows, extends the risks of currency exchange rate fluctuations, its trends, presents up-to-date knowledge of nowadays global financial system, market functioning and development, explains the role of the international financial institutions in the financial markets, as well as overviews fundamental and technical methods for corporate cross-border investments and investments into the financial markets, valuation. During the course, it is focused on development of practical and theoretical knowledge about the role of the multinational finance in nowadays modern and global world, as trends of the multinational finance system development, the role of the European monetary system and European monetary monetary union. |

| VVFRB16601 | PRICING | | 6 ECTS |
|---|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 30 hours/semester | **Consultations** – 4 hours/semester | **Individual work** - 96 hours/semester |
| **Course aim** | Be able to formulate price policy and strategy adequate to the business general objectives and choose the justify main solutionsfor business. | | |
| **Course description** | Pricing discipline deals with instruments (e. g. pricing strategies and methods, data collection, quantitative and qualitative dataprocessing methods, computer technology for addressing pricing issues) which are used in decision making process for effectivepricing. It focuses on pricing factors (e. g. customers, competitors, the organization's scope and cost, ethics and laws) and theirevaluation particularities, what on specific, but constantly changing market conditions enable to maximize the sustainabledevelopment. | | |

| VVFRB16609 | VALUATION OF FINANCIAL INSTRUMENTS | | 3 ECTS |
|---|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 2 hours/semester | **Individual work** - 33 hours/semester |
| **Course aim** | To provide students with both theoretical and comprehensive knowledge of the various financial and investment instruments, objectives of their use, rising risks and their valuation. | | |
| **Course description** | The course of Valuation of Financial Instruments analyses risks of variuos financial and invesmnet instruments and their valuation. Risks conected with financial instruments are separated. Big attention is paid to separate investment means such as bonds, stocks, investment funds, exchange traded funds. Invesmnet instruments used by profesional investors, such as derivatives and structural means, investment using borrowed funds are also analysed. Students will lear to evaluate risk of financial instruments. Basic knowledge how to form investment porftolios is presented. | | |

| VVTEB16204 | BUSINESS LAW | | 6 ECTS |
|---|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 30 hours/semester | **Consultations** – 4 hours/semester | **Individual work** - 96 hours/semester |
| **Course aim** | The aim of the course is to analyze and evaluate regulation of business relations. | | |
| **Course description** | Business Law is a branch of Civil Law which regulates relations settled in business. This course introduces students to fundamentals of Law, analyzes subjects of business Law and their legal aspects as well as establishment, activity, reorganization, liquidation, monopolistic activities of companies and main features of antimonopolistic Law. The course also introduces main aspects of Competition law and legal regulation of EU Company Law. | | |

| VVTEB16403 | BUSINESS LAW | | 3 ECTS |
|---|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 2 hours/semester | **Individual work** - 33 hours/semester |
| **Course aim** | The aim of the course is to analyze and evaluate regulation of business relations. | | |
| **Course description** | Business Law is a branch of Civil Law which regulates relations settled in business. This course introduces students to fundamentals of Law, analyzes subjects of business Law and their legal aspects as well as establishment, activity, reorganization, liquidation, monopolistic activities of companies and main features of antimonopolistic Law. The course also introduces main aspects of Competition law and legal regulation of EU Company Law. | | |

| VVTEB16806 | LAW | | 3 ECTS |
|---|---|---|---|
| **Lectures** – 36 hours/semester | **Practical works** – 12 hours/semester | **Consultations** – 2 hours/semester | **Individual work** - 30 hours/semester |
| **Course aim** | To indoctrinate students with the fundamentals of law, with system of law and order, the basic legal acts. | | |
| **Course description** | Description of law fundamentals: Source of the law, legal relations, breach of the law and legal responsibility, efficiency of the law, legal culture, structure of legal regulation, lawful behaviour, validity of the law, gaps of the law, its elimination. | | |

| VVTEB16805 | LAW | | 3 ECTS |
|---|---|---|---|
| **Lectures** – 24 hours/semester | **Practical works** – N/A | **Consultations** – 2 hours/semester | **Individual work** - 54 hours/semester |
| **Course aim** | To indoctrinate students with the fundamentals of law, with system of law and order, the basic legal acts. | | |

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| **Course description** | Description of law fundamentals: Source of the law, legal relations, breach of the law and legal responsibility, efficiency of the law, legal culture, structure of legal regulation, lawful behaviour, validity of the law, gaps of the law, its elimination. |

| VVVKB17808 | BUSINESS COMMUNICATION | | 3 ECTS |
|---|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 2 hours/semester | **Individual work** - 33 hours/semester |
| **Course aim** | To provide knowledge about the business communication process, peculiarities and determinants, to develop students' ability to understand and analyse business communication process and effectively communicate in the context of the professional activities. | | |
| **Course description** | Business communication course encompasses an overview of communication theories, conceptual framework, functions and peculiarities, macro and micro contexts of business communication. There is provided knowledge on verbal (written and oral) and non-verbal, internal and external business communication. The practice of communication, its determinants are analysed and practical skills of business communication are developed. | | |

| VVVKB20401 | HUMAN RESOURCES MANAGEMENT | | 6 ECTS |
|---|---|---|---|
| **Lectures** – 20 hours/semester | **Practical works** – 10 hours/semester | **Consultations** – 2 hours/semester | **Individual work** - 48 hours/semester |
| **Course aim** | To form theoretical understanding of human resources management and to train to practically apply these skills. | | |
| **Course description** | The main of concepts of human resources management, the significance of the strategic human resource management in the context of the organization, the main preconditions of human resources management system organization and management are presented in the course of human resources management. | | |

| VVVKB17029 | INTERCULTURAL COMMUNICATION | | 3 ECTS |
|---|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 2 hours/semester | **Individual work** - 33 hours/semester |
| **Course aim** | To prepare specialists for business and public companies, institutions and organizations, which have knnowledge and skills in intercultural communication area. | | |

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| **Course description** | Intercultural communication course is analysing conception of the intercultural communication, functions, influence areas and peculiarities of international business. Development of the intercultural communication science and micro and macro contexts of communication are studied. Conception of the culture is presented, elements, culture cluster theories and it's use in communication are analysed, knowledge about verbal and nonverbal communication external and internal communication (written and oral), and it's realisation in international organisations are squired, including communication peculiarities in the context of organisational networking. Cultural adoption process and it's phases, international competence structure and educational peculiarities are studied, practical intercultural communication skills are aquired. |

| VVVKB17157 | MANAGEMENT | | 3 ECTS |
|---|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 2 hours/semester | **Individual work** - 33 hours/semester |
| **Course aim** | To form systematic logical management perception by providing knowledge about management science and practical skillsneeded to organize the preparation of managerial decisions and their implementation. | | |
| **Course description** | During the management course the evolution of management theories is examined, key management functions - planning,organization, leadership, control - the essence and characteristics are disclosed, economic methods of management andtheir specifics of application, psychological management methods and their role, administrative management methods andtheir application specifics, management decision support system. The importance of the external environment impact onthe organization's management is explained. The most important organizations of competitiveness factors are considered.This will allow to understand basic management principles to master the specifics of the business management,understand the need for systematic management methods. | | |

| VVVKB17159 | MANAGEMENT | | 3 ECTS |
|---|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 2 hours/semester | **Individual work** - 33 hours/semester |
| **Course aim** | To form theoretical management knowledge base and to develop capabilities of using acquired knowledge in Management activity situation. | | |

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| **Course description** | During the course the following topics are covered: essence of management, basic concepts and their interpretations, evolution of management theories, cyber management model: subject and object of management. There are analysed organization as a system (systemic view application), types of organizations, elements and environment of organization, establishment of organizations and organization' management types of structures. Also there are analysed functions of management: planning, organizing, leadership and controlling, administrative and economic as well as psychological methods of management, manager role in the system of organization management management' decisions' preparation and adoption of principles, its process, assessment of the job of employees, pay for work and motivation. There are disputed change and conflict management. |

| VVVKB17181 | MANAGEMENT | | 3 ECTS |
|---|---|---|---|
| **Lectures** – 24 hours/semester | **Practical works** – 12 hours/semester | **Consultations** – 2 hours/semester | **Individual work** - 42 hours/semester |
| **Course aim** | To form basis of methodological knowledge of management and educate capabilities of professional logical thinking. | | |
| **Course description** | During management course contains management substance, basic concepts and their interpretation. The course conveys evolution of management, identified management object and subjects, organisation elements and surroundings, administrative solutions cycle and their phases, economic, psychological, administrative management methods. There are analysed management functions: prognostication, planning, organization, accounting, control and analysis, as well as projecting of management structures and adaptation, leadership, horizontal and vertical communication, employee evaluation, remuneration and motivation, organisation establishment and control. | | |

| VVVKB17813 | MANAGEMENT | | 3 ECTS |
|---|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – N/A | **Consultations** – 2 hours/semester | **Individual work** - 48 hours/semester |
| **Course aim** | To form basis of methodological knowledge of the base of theoretical knowledge of management and educate capabilities of professional critical, systematic, constructive thinking. | | |
| **Course description** | During the course the following topics are covered: essence of management, basic concepts and their interpretations, evolution of management theories, cyber management model: subject and object of management. There are analysed organization as a system (systemic view application), types of organizations, elements and environment of organization, establishment of organizations and organization' management types of structures. Also there are analysed functions of management: planning, organizing, leadership and controlling, administrative and economic as well as psychological methods of management, manager role in the system of organization management management' decisions' preparation and adoption of principles, its process, pay for work and motivation. There are disputed change and conflict management. | | |

| VVVKB17163 | MANAGEMENT | | 3 ECTS |
|---|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 2 hours/semester | **Individual work** - 33 hours/semester |
| **Course aim** | To form basis of methodological knowledge for organization management, and educate capabilities to apply an acquired knowledge in examining real professional situations. | | |
| **Course description** | During the course the following topics are covered: essence of management, basic concepts and their interpretations, evolution of management theories, cyber management model: subject and object of management. There is analyzed organization as a system (systemic view application), types of organizations, elements and environment of organization, establishment of organizations and organization' management types of structures. Also there are analyzed functions of management: planning, organizing, leadership and controlling, administrative and economic as well as psychological methods of management, manager role in the system of organization management, management' decisions' preparation and adoption principles, pay systems and motivation. There are disputed change and conflict management. | | |

| VVVKM19202 | BRAND MANAGEMENT | | 6 ECTS |
|---|---|---|---|
| **Lectures** – 20 hours/semester | **Practical works** – 10 hours/semester | **Consultations** – 10 hours/semester | **Individual work** - 120 hours/semester |
| **Course aim** | Acquire theoretical knowledge and practical skills in the field of brand management, to get abilities to use these knowledge and skills in in making marketing management decisions in domestic and foreign markets. | | |
| **Course description** | The brand management course study is analyzed as a complex strategic decision made by organizations as a whole in creating financial value for them. Theoretical models and advanced practical experience in the development and implementation of brand strategies are described in details. In the studies of the brand management course, the brand is analyzed as a complex strategic decision-making in marketing management decisions in organizations. The place of brand strategy development and implementation in marketing management decisions, the value created by the brand, principles, methods, cases of brand strategy development and implementation, their diversity are described in detail. Brand typologies, features, system, functions, identity, and positioning are characterized in detail. National and international competition is described as a key consideration in the design and implementation of brand omni-marketing channel communication strategies. Aspects of innovation that emerge in the design and development of brand strategies are examined. It reveals the psychological aspects of consumer awareness, choice and brand loyalty that are critical to a company's long-term growth. | | |

| VVVKM17056 | INTERNATIONAL MANAGEMENT (WITH COURSE PROJECT) | | 9 ECTS |
|---|---|---|---|
| **Lectures** – 20 hours/semester | **Practical works** – 20 hours/semester | **Consultations** – 15 hours/semester | **Individual work** - 185 hours/semester |
| **Course aim** | To provide knowledge of the contemporary international management and develop abilities to manage theoretical and practical tasks of business internationalisation. | | |
| **Course description** | International Management course focuses on the challenges and priorities of international management, international management theories and their typology, application of the theories in business practice. Business internationalisation aims, motivation and internationalisation modes, internationalisation paths depending on the company type, international business relations and the principles of their establishment, competition and cooperation in international value chains, application of the international networking theories in different business settings are the main topics covered durring the course. | | |

| VVVKM17288 | LEARNING ORGANIZATION (WITH COURSE PROJECT) | | 9 ECTS |
|---|---|---|---|
| **Lectures** – 20 hours/semester | **Practical works** – 20 hours/semester | **Consultations** – 15 hours/semester | **Individual work** - 185 hours/semester |
| **Course aim** | To get theoretical knowledge of the Learning organization, its methodological principles, to develop skills of applying theoretical knowledge in practice, allowing to identify conditions and motives for Learning organization, to assess the development of Learning organization and it's economic benefits, to choose models of renewal the learning process in various levels of the organization, to encourage innovative processes. | | |
| **Course description** | Subject of Learning organization examines the concept of the learning organization, its importance in business and management processes and decision-making, disclosed a learning organization attributes and properties and methods of how to determine whether an organization is learning. Also analyzes issues favorable for the development of a learning environment: recognition of differences, feedback ensuring the promotion of new ideas and recognition of errors. Analysis of the learning process: information acquisition, evaluation and application stages. Much attention is paid to the analysis of learning methods: exploration, research, monitoring, practical learning, reflection, experimentation. This will enable students to understand the basic principles of Learning organization, mastering the techniques specificity and understanding necessity of systematic methods for Learning organization's management. | | |

| VVVKM17108 | STRATEGIC MANAGEMENT | | 6 ECTS |
|---|---|---|---|
| **Lectures** – 20 hours/semester | **Practical works** – 10 hours/semester | **Consultations** – 10 hours/semester | **Individual work** - 120 hours/semester |
| **Course aim** | To provide a theoretical background of strategic management and comprehensive understanding of the strategic management process. To provide the knowledge and develop skills to apply strategic analyticall tools, which would help to make efective decisions and implement successful actions. To develop practical skills of strategic management. | | |

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| **Course description** | Strategic management course discusses implications of strategic management, business strategy, sources of competitive advantage, relationships between organization and competitive advantage, industry analysis, competition and market niches, competition in concentrated markets, entry in the market and competitive advantage, value creation in value chain, strategic management in changing environment, globalization and strategy, corporation strategy, strategy development process. Taking into consideration the peculiarities of contemporary strategies and analyzing international experience of organizations, the students are acquainted with the main models and tools of strategic management; the role of leadership is discussed; the factors impacting strategy are revealed; the problems and the means how to overcome these problems in order to successfully implement strategy are discussed. |

| VVVKM17100 | THEORY OF ORGANIZATION | | 6 ECTS |
|---|---|---|---|
| **Lectures** – 20 hours/semester | **Practical works** – 20 hours/semester | **Consultations** – 10 hours/semester | **Individual work** - 110 hours/semester |
| **Course aim** | To apply theoretical and practical knowledge of organization theory while making strategic decisions of management, structure and operations, designing situations and predicting actions of competitors, analyzing capabilities of creating a new organization, using elements of strategic thinking and strategic management. | | |
| **Course description** | The course provides a detailed analysis of organizational theories and their application in organizational management practical situations. There is introduction to the situational approach to the peculiarities of the application of organizational theory, analysing the relationship between the individual, organizational management and its environment. Possibilities of adapting the management structure of the organization in the changing complex environment are discussed: level of specialization, configuration, decision making, delegation of powers, level of formalization. Problems of activity diversification and strategy formation are solved. | | |

## CIVIL ENGINEERING FACULTY

| STTMB17042 | ENGINEERING MECHANICS | 6 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 30 hours/semester | **Consultations** – 4 hours/semester |
| **Laboratory works** – N/A | **Individual work** - 96 hours/semester | |
| **Course aim** | Get acquainted with general notions of mechanics and with solution methods of statical, kinematical and dynamical problems of rigidbody mechanics. To acquire and assimilate knowledge about behaviour of mechanical objects under action of forces at knownboundary and initial conditions. To understand main fundamental principles of statics and dynamics. To learn solving practicalproblems of mechanics. | |

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| **Course description** | Object of mechanics. Idealizations. Fundamental axioms, laws and notions of mechanics. Particle, rigid body, mechanical system.Force, couple, moment, link. Forces in 2D and 3D space. Free-body diagram. Equilibrium of particle and rigid body. Distributed loads,gravity centre. Friction. Notions of kinematics. Velocity, speed, acceleration, path. Equations of motion. Kinetics of particle and rigidbody. Differencials equations of motion. Fundamental theorems of kinetics. Fundamentals of analytical mechanics. |

| STTMB17053 | MECHANICS OF MATERIALS | 6 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 4 hours/semester |
| **Laboratory works** – 15 hours/semester | **Individual work** - 96 hours/semester | |
| **Course aim** | To provide the knowledge and to develop the engineering skills for analyzing strength and stiffness of deformable elements subjectedto combined loading and computing skills for analysis of rods subjected to specific effects, to prepare for the studies of structuraldesign. | |
| **Course description** | Strength and stiffness of bending beams. Mechanical properties of materials. Compound stresses. Buckling of bar. Deformation fromdynamic loading. Cyclic deformation. Fundamentals of fracture theory. | |

| STTMB17055 | MECHANICS OF MATERIALS | 6 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 4 hours/semester |
| **Laboratory works** – 15 hours/semester | **Individual work** - 96 hours/semester | |
| **Course aim** | To give knowledge and acquaint with engineering methods for simple strength and stiffness problems. | |
| **Course description** | General principle, hypothesis, assumption, conception. Tension and compression. Geometrical properties of cross sections. Shear.Torsion. Bending. Fundamentals of stress-strain state. Compound stresses. Dynamic and cyclic loading. Understanding of bucklingand cracking. | |

| STTMB17058 | MECHANICS OF MATERIALS 2 | 6 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 4 hours/semester |
| **Laboratory works** – 15 hours/semester | **Individual work** - 96 hours/semester | |

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| **Course aim** | To provide knowledge of engineering methods for calculation strength and stiffness of structural elements subjected to compoundstresses. To train up the potency of application of these methods by oneself. To develop the potency to analyse the mechanicalpeculiarities of structural elements under specific loadings. To prepare for the studies of the mechanics of various structures. |
| **Course description** | Deflection of beams. Techniques for determining beam displacements. Statically indeterminate beams. States of stress and strain.Strength and plasticity hypothesis. Strength of structural elements under compound stresses. Stresses in a thin-walled pressurevessels. Stress concentration. Contact stresses. Stability of columns. Buckling. Influence of dynamic loadings. Variable stresses.Fatigue. Brittle fracture of cracked elements. Experimental investigations of stress and strain of elements subjected to variousloadings. |

| STTMB17105 | NUMERICAL ANALYSIS OF STRUCTURES - BIM 2 | 3 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 2 hours/semester |
| **Laboratory works** – N/A | **Individual work** - 33 hours/semester | |
| **Course aim** | To give knowledge about finite element method. To research design of bar structures displacements and internal forces by finite element method. To give knowledge about solution of various mathematical, mechanical and engineering problems using special software. | |
| **Course description** | Assumption of finite element method. Creation of bar structures, tension-compression and bendable finite elements, main dependencies. Stiffness equation and stiffness matrix of element, calculation of their coefficients. Creation of finite element system algebraic equilibrium equations. Algorithm of structure displacements and internal forces calculation; their calculation by PC. | |

| STGSB17062 | HUMAN'S SAFETY AND ENVIRONMENTAL PROTECTION | 3 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – N/A | **Consultations** – 2 hours/semester |
| **Laboratory works** – 15 hours/semester | **Individual work** - 33 hours/semester | |
| **Course aim** | To provide knowledge on occupational safety legislation and principles of occupational safety and health, occupational hygiene,environmental protection, ergonomics and fire protection. | |
| **Course description** | Human safety conception, meaning and tasks. Management of work safety. Legal reglamentation of human safety. Man andenvironment. Atmosphere pollution and protection. Waters pollution and protection. Wastes. Risk management. Occupationalhygiene. Occupational stress and management. Ergonomics, general principles. Electrical safety. Fire protection. Evacuation frombuildings. | |

| STGSB17174 | MATERIALS SCIENCE AND BUILDING MATERIALS | 6 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – N/A | **Consultations** – 4 hours/semester |
| **Laboratory works** – 30 hours/semester | **Individual work** - 96 hours/semester | |
| **Course aim** | To give the knowledge about meaning of material knowledge, their structure, properties, basic investigations methods, practical use. | |
| **Course description** | Classification of materials according to the origin and structure. Material composition, structure and properties of the relationship.Materials selection and use. The main characteristics of building materials and their methods. Structural ceramics, glass andglassware. Binders. Concrete and mortar configurations, features and articles. Painting materials. Heat and sound insulatingmaterials. Properties of wood and products from it. Properties of polymers and plastics in use. | |

| STVNB17311 | BUILDING CONSTRUCTION TECHNOLOGY AND ORGANIZATION | 3 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 4 hours/semester |
| **Laboratory works** – N/A | **Individual work** - 31 hours/semester | |
| **Course aim** | To provide general knowledge about efficient building construction technology and construction management. | |
| **Course description** | Basics of building construction technology and construction organization. Safe working principles in construction. Basic of construction low. | |

| STVNB17303 | TECHNOLOGY OF CONSTRUCTION PROCESSES | 6 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 30 hours/semester | **Consultations** – 4 hours/semester |
| **Laboratory works** – N/A | **Individual work** - 96 hours/semester | |
| **Course aim** | Providing information on construction technology and developing skills of practical application of the acquired knowledge. | |

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| **Course description** | Knowledge on technology of construction processes is provided; construction phases, approaches and processes are analysed. The module covers topics as follows: - technology of construction processes and its relationship with other disciplines, evolution of construction in Lithuania and its future; - types of piles and deepening forms, hammering piles and ensuring their quality, installation of wringing pits, works with moulds; reinforcement forms, their connection principles, their products, reinforcement of not tightened constructions, tightening of reinforcement, reinforcement of prestressed constructions, production of, feeding of concrete mix to falsework and consolidation of concrete mix. |

| STGGB17268 | APPLIED PHYSICS | 6 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 4 hours/semester |
| **Laboratory works** – 15 hours/semester | **Individual work** - 96 hours/semester | |
| **Course aim** | To provide theoretical and practical knowledge of building physics - to introduce the building climatology, thermal physics, architectural and building acoustics, natural and artificial lighting bases. | |
| **Course description** | Physics building consists of three components: thermal engineering, construction and architectural acoustics, and light engineering. Thermal technology areas examined by the building of partitions choice questions according to their heat and humidity occurring processes and the building exterior and interior climate. Building and architectural acoustics field goal - to select appropriate design solutions to ensure acoustic comfort in the building. Light technical introduction to the field of natural and artificial lighting bases. | |

| STGGB17030 | BASIS OF STRUCTURAL DESIGN | 3 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 2 hours/semester |
| **Laboratory works** – N/A | **Individual work** - 33 hours/semester | |
| **Course aim** | To provide theoretical knowledge of loads and action and their practical skills to designings buildings and structures. Teach to design stresses combination. | |
| **Course description** | Knowledge about the management of the reliability of building and assessment of loads and action during the design of a building. | |

| STGGB17173 | ENGINEERING GEOLOGY | 3 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – N/A | **Consultations** – 2 hours/semester |
| **Laboratory works** – 15 hours/semester | **Individual work** - 33 hours/semester | |
| **Course aim** | An understanding of geological processes and their influence in design and construction. | |
| **Course description** | Earth structure, composition and origin. Minerals and rocks. Earth's interior and exterior geological processes. Geological structures. Tectonic processes. Development of Earth crust. Clasification of minerals, rocks and soils. Physical and mechanical features of soils. Origin and types of groundwater, physical and chemical properties. Flow of groundwater. Polution of soil and groundwater. Weathering. Eolian processes. Glaciation, deglaciation, related processes and surface forms. Water-erosion (fluvial, karst), seasonal and permafrost processes. Mineral deposits of Lithuania. | |

| STGGB17195 | FOUNDATION ENGINEERING (WITH COURSE PROJECT) | 6 ECTS |
|---|---|---|
| **Lectures** – 24 hours/semester | **Practical works** – 24 hours/semester | **Consultations** – 2 hours/semester |
| **Laboratory works** – N/A | **Individual work** - 110 hours/semester | |
| **Course aim** | General knowledge about design of various types of foundations: design requirements, rational types of foundations, their basement and dimensions calculations. | |
| **Course description** | Foundation design. Analysis of initial design data. Shallow foundations: types, design. Pile foundations: design, principles construction technology. Deep foundations: single bored and bored piles wall. Underpinning. Retaining walls. Environmental problems in geotechnical engineering. | |

| STGGB17053 | MULTI-STOREY BUILDINGS | 3 ECTS |
|---|---|---|
| **Lectures** – 36 hours/semester | **Practical works** – 12 hours/semester | **Consultations** – 2 hours/semester |
| **Laboratory works** – N/A | **Individual work** - 30 hours/semester | |
| **Course aim** | Provide theoretical knowledge and practical skills of multi-storey buildings structures analysis constructing and design. | |

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| **Course description** | Structural aspects of multi-storey buildings structures with fundamental approaches to the analysis of the behavior of different form of buildings structures including frame, shear wall, tubular, core and outrigger-braced systems. Loadings and actions to which the sructures are subjected, including the effect of wind forces design decisions, dynamic response of structures subjected to wind forces. Design criteria which are of the greatest relevance to multi-storey buildings, and various structural forms which have developed over the years of engineering practice. Modeling of building structures for analysis and design. Design of structural elements and assemblies. |

| STGGB17037 | REINFORCED CONCRETE STRUCTURES 2 | 6 ECTS |
|---|---|---|
| **Lectures** – 45 hours/semester | **Practical works** – 30 hours/semester | **Consultations** – 4 hours/semester |
| **Laboratory works** – N/A | **Individual work** - 81 hours/semester | |
| **Course aim** | Knowledge about design of reinforced concrete structures by applying calculation methods based on serviceability limit states; types and design peculiarities of over ground bearing structures; structural solutions and design peculiarities of shallow and deep foundations. | |
| **Course description** | Cracking and stiffness of reinforced concrete members. Reinforced concrete structures of multi-storey buildings. Reinforced concrete structures of single-storey buildings. Foundation structures. | |

| STGGB17038 | REINFORCED CONCRETE STRUCTURES 2 (COURSE PROJECT) | 3 ECTS |
|---|---|---|
| **Lectures** – N/A | **Practical works** – 30 hours/semester | **Consultations** – 2 hours/semester |
| **Laboratory works** – N/A | **Individual work** - 48 hours/semester | |
| **Course aim** | To provide knowledge and ability to design reinforced concrete elements: foundations, columns, slabs. | |
| **Course description** | Design and construction of reinforced concrete elements: foundation, column, slab. | |

| STMEB17040 | ALUMINIUM STRUCTURES | 3 ECTS |
|---|---|---|
| **Lectures** – 36 hours/semester | **Practical works** – 12 hours/semester | **Consultations** – 2 hours/semester |
| **Laboratory works** – N/A | **Individual work** - 30 hours/semester | |

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| **Course aim** | Indocrinating students with the fundamentals of aluminium structures, with their application, detailing and proportioning. |
| **Course description** | Aluminium alloys and their mechanical properties. Application of aluminium structures. Characteristic and design values. Assortment of aluminium profiles. Connections. Calculation and design of aluminium structures. Application examples. Aluminum structures fatigue assessment . Aluminum structures manufacturing and installation features. |

| STMEB17032 | INTEGRATED PROJECT (STEEL STRUCTURES 2; BUILDING CONSTRUCTION TECHNOLOGY AND ORGANIZATION) | 6 ECTS |
|---|---|---|
| **Lectures** – N/A | **Practical works** – 45 hours/semester | **Consultations** – 4 hours/semester |
| **Laboratory works** – N/A | **Individual work** - 111 hours/semester | |
| **Course aim** | Getting the knowledge and skill design of the truss and beam-columns and their joints. Getting the knowledge and skill for theinstallation of metal structures technology card design peculiarities. | |
| **Course description** | First part of module is related to design of framed steel structures. In this part of the module students learn about calculations of theloads, design of steel truss, beam- columns and joint connections. In second part of module students learn about the technology card,machinery and equipment selection, labor cost estimation, scheduling of works. | |

| STMEB17031 | STEEL STRUCTURES 2 | 6 ECTS |
|---|---|---|
| **Lectures** – 45 hours/semester | **Practical works** – 30 hours/semester | **Consultations** – 4 hours/semester |
| **Laboratory works** – N/A | **Individual work** - 81 hours/semester | |
| **Course aim** | The ensurance of necessary knowledge and skills on the design of single-storey building steel structures, their members and connections according to the European and international standards is foreseen. Developing the abilities to apply that knowledge updating them on a permanent basis, taking into account the newly emerging structural design tools and techniques. The ensured knowledge and skills must become the basis for acquiring the competence for design of building and structural systems. | |

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| **Course description** | odule covers the second part of course for design of steel structures. This part introduces with structures of single storey buildings like roof trusses, portal frames and compact and built-up beam-columns. In the course the short review of collecting the loads and calculating of their combinations for single storey buildings is presented. The basic knowledge about the design and detailing of connections of building structures are ensured for students. The module covers also the questions of design of frames, roof trusses and travelling crane girders and their joints. Theoretical knowledge and design skills are consolidated during practical lectures and preparation of course project. |

| STTMM17132 | MECHANICS OF CONTINUAL STRUCTURES | 6 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – N/A |
| **Laboratory works** – N/A | **Individual work** - 115 hours/semester | |
| **Course aim** | To explain mathematical models of structures on elastic basement. General theory of continual structures (plates, shells) stress strain design subjected by external loading. | |
| **Course description** | General information of curved surface theory. Generalized surface stress and strain state structural member. Main equations of geometrical linear and nonlinear structures in curvilineared coordinat system.Design models and algorithms for various types of shells. Structure on deformable soil design theory. Mechanical models for basement and mathematical equations. Extreme energy principles and mathematical models. Calculating algorithms of structures on deformable basement. | |

| STGGM17124 | DURABILITY AND PROBABILITY ANALYSIS OF BUILDING STRUCTURES | 6 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – N/A |
| **Laboratory works** – N/A | **Individual work** - 115 hours/semester | |
| **Course aim** | To train students to analyze, evaluate and forecast durability of construction works. To train students to determine reliability of safety and serviceability of members in design and in evaluation of members in service. | |
| **Course description** | Concept of durability, its parameters. Corrosion of concrete, masonry, metal (reinforcement) and reinforced concrete, destruction of organic materials, protection of structures in aggressive environment. Forecast of working life for structures. Analysis of regulated reliability and application of it as criterion in design and evaluation of members. | |

| STMEM17148 | COMPUTER AIDED DESIGN OF BRIDGES AND SPECIAL STRUCTURES (BIM) (WITH COURSE PROJECT) | 9 ECTS |
|---|---|---|
| **Lectures** – 15 hours/semester | **Practical works** – N/A | **Consultations** – N/A |
| **Laboratory works** – 45 hours/semester | **Individual work** - 180 hours/semester | |
| **Course aim** | To teach to apply computers programs to design specific structures. | |
| **Course description** | Modern software packages for structural analysis, their abilities, advantages and disadvantages: STAAD (basis program) and one in choice: Lira, Midas, Sofistik, Robot.. Acquisition of command of different programs. Preparation of models for analysis of beam and continuum structures, preparation of initial data for analysis, automation of modeling. Modeling particularities of traffic, wind, soil and hydrostatics actions. Influence lines. Regulation of internal forces. Design (check, select) of steel structures, calculation and design of reinforced concrete structures; automated preparation of designs. Calculation of vibrations modes and forced vibrations. Buckling of structures. Design of bridges, towers, reservoirs, hydraulic structures etc. Distribution transversal of charges with program Tiltai-2000. | |

| STMEM17150 | STRUCTURES FOR COMPOSITE STEEL AND CONCRETE BUILDINGS | 6 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – N/A |
| **Laboratory works** – N/A | **Individual work** - 115 hours/semester | |
| **Course aim** | Student will understand main peculiarities of behavior and design of steel - concrete composite structures. | |
| **Course description** | Scope, definition, utilization and efficiency of composite structures, materials and properties. Stress - strain state of composite members and methods of its analysis. Peculiarities of behavior and design of composite structural members and joint connections. | |

## CREATIVE INDUSTRIES FACULTY

| KIKOB18601 | ADVERTISING (WITH COURSE WORK) | | 6 ECTS |
|---|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 4 hours/semester | **Individual work** - 111 hours/semester |

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| **Course aim** | Acquaint with objective of advertisement, its history, forms, ways of application, integration with other communication activities, tendencies, creation, evaluation of effectiveness, pecularities of analysis data. |
| **Course description** | Basics of Advertisement module is complex and covers theoretical, practical, creative activites which refers to holistic approach and form contemporary understanding of advertising as a organizational tool of cummunication. |

| KIKOB20107 | CREATIVE INDUSTRIES STUDIES (WITH COURSE WORK) | | 6 ECTS |
|---|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 30 hours/semester | **Consultations** – 4 hours/semester | **Individual work** - 96 hours/semester |
| **Course aim** | Provide main knowledge and skills to organize and implement communication products and services in the creative services sector companies. | | |
| **Course description** | Familiarize with Creative Industries conception and phenomena, reveal CI links with changes in economic and ITC. Explain CI structure, principles of action, business forms and main skills, important in CI business. | | |

| KIKOB20102 | DIGITAL COMMUNICATION | | 6 ECTS |
|---|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 30 hours/semester | **Consultations** – 4 hours/semester | **Individual work** - 96 hours/semester |
| **Course aim** | The main aim of the course is to provide students with a comprehensive understanding of how digital technologies and the rise of social media are changing communication and marketing strategies across different industries. This includes learning about marketing concepts that are relevant in the digital environment, analysing best practice examples, and developing skills for creating, delivering and communicating value by using digital communication tools and social media platforms. | | |
| **Course description** | The course provides balanced and well-designed training in the principles of digital and social marketing communication. The syllabus is a combination of theoretical knowledge and practical skills. By the end of this course, the students will be able to understand the core processes of planning a digital marketing strategy by employing the major online channels. | | |

| KIKOB20105 | INNOVATION MANAGEMENT | | 6 ECTS |
|---|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 30 hours/semester | **Consultations** – 4 hours/semester | **Individual work** - 96 hours/semester |
| **Course aim** | The course aims to provide students with the knowledge and skills necessary for innovation development and change management. | | |

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| **Course description** | This module presents key concepts and principles of innovation and change management process, innovation classification, creativity stimulation tools and methods, ideas generation and evaluation process, management of innovation development team, development of innovation project, sources of innovation financing, innovation commercialization. Understanding of business change. Traditional and new business models, knowledge-based economy, gift economy. Free software, free music, free literary movements and business models. Creative business teams, motivation, goal formulation and execution of the tasks progress measurement. Creative business process analysis and improvement. |

| KIKOB17077 | INTEGRATED PROJECT | | 9 ECTS |
|---|---|---|---|
| **Lectures** – 15 hours/semester | **Practical works** – 60 hours/semester | **Consultations** – 6 hours/semester | **Individual work** - 159 hours/semester |
| **Course aim** | Provide students with practical knowledge and to integrate the knowledge of management, communication and creative industries gained in other courses, through the implementation of the practical project coordinated by the tutors. | | |
| **Course description** | Course of Comprehensive Project is constructed to gain practical skills as well as to apply and to integrate theoretical knowledge of creative industries, communication, management in planning and execute comprehensive project in the field of creative industries. | | |

| KIKOB18202 | MASS COMMUNICATION (WITH COURSE WORK) | | 6 ECTS |
|---|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 30 hours/semester | **Consultations** – 4 hours/semester | **Individual work** - 96 hours/semester |
| **Course aim** | The course aims to familiarize with the classical and modern theories of mass communication, a review of the most important means of mass communication theories and methodological problems studied. Historical development of mass communication theories overview. | | |
| **Course description** | To introduce the mass communication theories, their problems, old and new media, and their interaction. Understand what separates and share new media with the old, the traditional media. Find out what are the signs of new media and how it changes the traditional concepts of mass communication; new media as part of a research in mass communication research field. Coursework consists of theoretical-descriptive and critical, analytical parts (estimated at 33.3 percent.). The student chooses one of mass communication theory, it describes from the scientific literature, and later analyzed on the basis of the theory of criticism in the scientific literature and provide the overall picture, as far as theory is relevant today as it has changed, what can be studied on the basis of the theory today. | | |

| KIKOB17065 | PUBLIC RELATIONS | | 6 ECTS |
|---|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 30 hours/semester | **Consultations** – 4 hours/semester | **Individual work** - 96 hours/semester |
| **Course aim** | To train in-depth understanding of principles of public relations, to develop basic communications with publics and media skills, to present theoretical and practical basis of public relations along with its problematic, application and tendencies. | | |
| **Course description** | Public relations course consists of theoretical part in which the students will be introduced with fundamental concepts of public relations, its history, formation, strategies and tactics of public relations, planning and evaluation; and practical part in which students will perform individual and group real life public relation practice illustrating tasks. In this course students should learn how to identify and to communicate with various publics, to analyze and to organize public relations campaigns and media relations, as well as to integrate social media. | | |

| KIKOB18402 | QUALITATIVE RESEARCH (WITH COURSE WORK) | | 6 ECTS |
|---|---|---|---|
| **Lectures** – 8 hours/semester | **Practical works** – 4 hours/semester | **Consultations** – 4 hours/semester | **Individual work** - 144 hours/semester |
| **Course aim** | To get knowledge and skills necessary for doing qualitative research. | | |
| **Course description** | Course creates possibility for students to get acquainted with theoretical presumptions of qualitative research methods, to find out purpose and specifics of qualitative research, to get acquainted with data collection in qualitative researches. Students perform qualitative research: prepare research programme, perform interviews and focus group discussions. Students prepare research report - course-paper. Students have to demonstrate ability to choose appropriate research methods, to perform the research and to interpret and present research findings. | | |

| KIKOB17207 | SOCIOLOGY | | 3 ECTS |
|---|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 2 hours/semester | **Individual work** – 33 hours/semester |
| **Course aim** | To introduce the knowledge about social reality, to help to understand a sociological view towards society, it's structure and processes, which influence individual's socialization, people inter- relations, social action and collaboration. | | |
| **Course description** | The course analyzes the subject of sociology, methods, laws' structure, its categories and position among humanitarian disciplines. Special attention is paid to the development of a social process, its standards and emerging peculiarities. The course also presents relation between sociological theory and research. | | |

| KIKOB18401 | VISUAL COMMUNICATION (WITH COURSE WORK) | | 6 ECTS |
|---|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 30 hours/semester | **Consultations** – 4 hours/semester | **Individual work** - 96 hours/semester |
| **Course aim** | In this module students will learn about complexity of visual communication theory: semiotics (formation of content in visual message), psychology of Art (visual perception and perceptual mechanism), and communication (general principles of social communication). In parallel they will gain some understanding in methods of message visualization and rhetoric, the graphic design tools and ways to send a visual message to a target audience. During practical work students apply the knowledge in semio. | | |
| **Course description** | In this module students will learn about complexity of visual communication theory: semiotics (formation of content in visual message), psychology of Art (visual perception and perceptual mechanism), and communication (general principles of social communication). During practical work students will apply the knowledge in methods of message visualization and rhetoric, the graphic design tools and ways to send a visual message to a target audience. | | |

| KIPIB92004 | FILM PROJECTS | | 3 ECTS |
|---|---|---|---|
| **Lectures** – 15 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – N/A | **Individual work** - 50 hours/semester |
| **Course aim** | The student will know and understand how to manage and create visual messages in video format and how to effectively prepareand presentBusiness presentation for the target audience. Students will also have to create a creative work - is based on acomplete visual narrative, which is dedicated to a particular target audience. | | |
| **Course description** | The student will know and understand how to manage and create visual messages in video format and how to effectively prepareand presentBusiness presentation for the target audience. Students will also have to create a creative work - is based on acomplete visual narrative, which is dedicated to a particular target audience. | | |

| KIPIB92003 | TV DEVELOPMENT | | 3 ECTS |
|---|---|---|---|
| **Lectures** – 15 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 2 hours/semester | **Individual work** - 48 hours/semester |
| **Course aim** | To familiarize students with techniques and processes of developing entertainment and documentary television. | | |
| **Course description** | TV Development is a course that familiarizes students with techniques and processes of developing entertainment anddocumentary television. Students get an opportunity to practice these techniques and processes in cross-cultural groupsconsisting of both Lithuanian and international students. The language of instruction is English, but students may choose tocomplete the assignments either in English or in Lithuanian. | | |

| KIPIB18602 | URBAN STUDIES | | 3 ECTS |
|---|---|---|---|
| **Lectures** – 4 hours/semester | **Practical works** – 8 hours/semester | **Consultations** – 2 hours/semester | **Individual work** - 66 hours/semester |
| **Course aim** | The aim of the course is to introduce students to the basic concepts of the urban studies and to the recent debates on the principles of urban development and cultural urban planning, to develop abilities to analyze urban spaces and to develop and launch collective projects in creative communication. | | |
| **Course description** | The course analyzes the city as a creative field of communication, examines the creative concept of the city - a new model of urban regeneration and development globalization. The principles of field research are taught. The course consists of theoretical and practical parts. During the course, students are introduced to the interventions and creative potential of the city's public spaces - from the point of view of the creative industries and entertainment industry, practical creative activations take place. Subject trends and model of cultural heritage and creative tourism, analysis of practical creative possibilities. At the end of the course, a creative project is created. | | |

| KIUSB17152 | ENGLISH LANGUAGE | | 3 ECTS |
|---|---|---|---|
| **Lectures** – N/A | **Practical works** – 30 hours/semester | **Consultations** – 2 hours/semester | **Individual work** - 48 hours/semester |
| **Course aim** | To help students develop linguistic and communicative skills, acquire knowledge according to CEFR B2 - C1 level in order to communicate spontaneously both in written and spoken forms on daily, cultural and professional topics. | | |
| **Course description** | The course covers an important aspect of academic language study relevant to all subject areas. The aim of the course is to reach a high (B2-C1) level of English to study in an academic institution. The course is aimed at the first-cycle students with B1-B2 level of English. The integrated skills course will develop students' reading, writing, listening and speaking skills in an academic context. It will enable students to prepare assignments, write a research paper in English. | | |

| KIUSB17123 | SPECIALITY ENGLISH LANGUAGE | | 3 ECTS |
|---|---|---|---|
| **Lectures** – N/A | **Practical works** – 30 hours/semester | **Consultations** – 2 hours/semester | **Individual work** - 48 hours/semester |
| **Course aim** | To help students acquire and develop linguistic and professional communicative skills as well as relevant knowledge so that the future specialists are able to use their acquired competences and analyse information, communicate in spoken and written language in their everyday, academic and Professional situations. | | |

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| **Course description** | The course is targeted at the development of Mathematics in Modern Technologies students' C1 level of the English Language competences, for further development of skills gained in the course English Language for communication in both daily and professional situations. The course develops the independent user's language skills, professional vocabulary, the correct technical and scientific language usage knowledge, abilities to analyse and summarize speciality literature, effective academic presentation skills. |

| KIUSB18110 | SPECIALITY ENGLISH LANGUAGE | | 3 ECTS |
|---|---|---|---|
| **Lectures** – N/A | **Practical works** – 45 hours/semester | **Consultations** – 2 hours/semester | **Individual work** - 33 hours/semester |
| **Course aim** | To help students acquire and develop linguistic and professional communicative skills as well as relevant knowledge so that the future specialists are able to use their acquired competences and analyse information, communicate in spoken and written language in their everyday, academic and professional situations. | | |
| **Course description** | The module Speciality English Language is targeted at the development of Creative Industries and Entertainment Industry students' C1 level of the English language competences, for further development of skills gained in the module English for Creative Communication for communication in both daily and professional situations. The course develops the independent user's language skills, professional vocabulary (through media topics), the correct technical and scientific language usage knowledge, abilities to analyse and summarize speciality literature, effective academic presentation skills. | | |

| KIUSB17129 | SPECIALITY ENGLISH LANGUAGE 1 | | 3 ECTS |
|---|---|---|---|
| **Lectures** – N/A | **Practical works** – 45 hours/semester | **Consultations** – 2 hours/semester | **Individual work** - 33 hours/semester |
| **Course aim** | To help students acquire and develop linguistic and professional communicative skills as well as relevant knowledge so that the future specialists are able to use their acquired competences and analyse information, communicate in spoken and written language in their everyday, academic and Professional situations. | | |
| **Course description** | The course is targeted at students of Business Management Faculty with a B1-B2 level of the English Languageknowledge and skills, and who seek to gain professional language skills to communicate more effectively in English indaily and in Professional situation on topics covered in the list. During the course, students develop the independent user's(B) language skills: reception (listening and reading comprehension), production and interaction (speaking and writing),and mediation (translation). Students also master basic professional vocabulary, gain knowledge of the correct technicaland scientific language usage, develop skills in analysing the speciality literature. | | |

| KIUSB17146 | SPECIALITY ENGLISH LANGUAGE 2 | | 3 ECTS |
|---|---|---|---|
| **Lectures** – N/A | **Practical works** – 45 hours/semester | **Consultations** – 2 hours/semester | **Individual work** - 33 hours/semester |
| **Course aim** | To help students acquire and develop linguistic and professional communicative skills as well as relevant knowledge so that the future specialists are able to use their acquired competences and analyse information, communicate in spoken and written language in their everyday, academic and Professional situations. | | |
| **Course description** | The course is targeted at the development of Business Management Faculty students' C1 level of the English Languagecompetences, for further development of skills gained in the course Speciality English Language 1 for communication inboth daily and Professional situations. The course develops the independent user's language skills, professionalvocabulary, the correct technical and scientific language usage knowledge, abilities to analyse and summarize specialityliterature, effective academic presentation skills. | | |

| KIUSB17116 | SPECIALITY ENGLISH LANGUAGE | | 3 ECTS |
|---|---|---|---|
| **Lectures** – N/A | **Practical works** – 30 hours/semester | **Consultations** – 2 hours/semester | **Individual work** - 48 hours/semester |
| **Course aim** | To help students acquire and develop linguistic and professional communicative skills as well as relevant knowledge so that the future specialists are able to use their acquired competences and analyse information, communicate in spoken and written language in their everyday, academic and Professional situations. | | |
| **Course description** | The course is targeted at the development of Civil Engineering, Architectural Engineering, Construction Technology and Management students' C1 level of the English Language competences, for further development of skills gained in the course English Language for communication in both daily and professional situations. The course develops the independent user's language skills, professional vocabulary, the correct technical and scientific language usage knowledge, abilities to analyse and summarize speciality literature, effective academic presentation skills. | | |

| KIUSB17185 | SPECIALITY ENGLISH LANGUAGE | | 3 ECTS |
|---|---|---|---|
| **Lectures** – N/A | **Practical works** – 30 hours/semester | **Consultations** – 2 hours/semester | **Individual work** - 48 hours/semester |
| **Course aim** | To help students acquire and develop linguistic and professional communicative skills as well as relevant knowledge so that the future specialists are able to use their acquired competences and analyse information, communicate in spoken and written language in their everyday, academic and Professional situations. | | |

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| **Course description** | The course is targeted at the development of Electronics Faculty students' C1 level of the English Language competences, for further development of skills gained in the course English Language for communication in both daily and Professional situations. The course develops the independent user's language skills, professional vocabulary, the correct technical and scientific language usage knowledge, abilities to analyse and summarize speciality literature, effective academic presentation skills. |

| KIUSB17119 | SPECIALITY ENGLISH LANGUAGE | | 3 ECTS |
|---|---|---|---|
| **Lectures** – N/A | **Practical works** – 30 hours/semester | **Consultations** – 2 hours/semester | **Individual work** - 48 hours/semester |
| **Course aim** | To help students acquire and develop linguistic and professional communicative skills as well as relevant knowledge so that the future specialists are able to use their acquired competences and analyse information, communicate in spoken and written language in their everyday, academic and Professional situations. | | |
| **Course description** | The course is targeted at the development of Environmental Engineering Faculty students' C1 level of the English language competences, further development of skills gained in the course English language for communication in both daily and professional situations. The course develops the independent user's language skills, professional vocabulary, the correct technical and scientific language usage knowledge, abilities to analyse and summarize speciality literature, effective academic presentation skills. | | |

| KIUSB17188 | SPECIALITY ENGLISH LANGUAGE | | 3 ECTS |
|---|---|---|---|
| **Lectures** – N/A | **Practical works** – 30 hours/semester | **Consultations** – 2 hours/semester | **Individual work** - 48 hours/semester |
| **Course aim** | To help students acquire and develop linguistic and professional communicative skills as well as relevant knowledge so that the future specialists are able to use their acquired competences and analyse information, communicate in spoken and written language in their everyday, academic and Professional situations. | | |
| **Course description** | The course is targeted at the development of Mechanics Faculty students' C1 level of the English Language competences, for further development of skills gained in the course English Language for communication in both daily and Professional situations. The course develops the independent user's language skills, professional vocabulary, the correct technical and scientific language usage knowledge, abilities to analyse and summarize speciality literature, effective academic presentation skills. | | |

| KIUSA17005 | SPECIALITY ENGLISH LANGUAGE | | 3 ECTS |
|---|---|---|---|
| **Lectures** – N/A | **Practical works** – 30 hours/semester | **Consultations** – 2 hours/semester | **Individual work** - 48 hours/semester |

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| **Course aim** | To help students acquire and develop linguistic and professional communicative skills as well as relevant knowledge so that the future specialists are able to use their acquired competences and analyse information, communicate in spoken and written language in their everyday, academic and Professional situations. |
| **Course description** | The Speciality English Language course is targeted at students of the Faculty of Architecture with the B2 level of English. The course is designed to help students to master the Speciality English Language which would enable them to effectively communicate in English in any professional situation both in oral and written forms. Special skills and general abilities are developed through speciality topics presented in the course. After acquiring communicative (reading, writing, listening and speaking), cognitive, general and intercultural competences, students are able to successfully apply them while searching for specific information or while adapting to international market. |

| KILSB18002 | Lithuanian Language 2 (for Foreign Students) | | 3 ECTS |
|---|---|---|---|
| **Lectures** – N/A | **Practical works** – 32 hours/semester | **Consultations** – N/A | **Individual work** - 48 hours/semester |
| **Course aim** | Learning the basics of listening, reading, writing, interacting, and understanding information in Lithuanian in typical academic, cultural and social situations. | | |
| **Course description** | Topics: food and purchases, at the store, at the café, at the restaurant, and at someone's home. Lithuanian economy and finances. Connections between studies and language. Service culture in Lithuania. Architecture of Vilnius. Lithuanian news and current events. Health and relaxation. At the doctor's. Parts of the body. The health industry in Lithuania. Houses, apartments, and furniture. How to rent an apartment? Lithuanian folklore: aphorisms and sayings. The best known objects and most-visited places in Lithuania. How to show agreement or disagreement. Travel and tourism in Lithuania. Free time. Famous Lithuanian musicians and artists. Sports in Lithuania. Basketball players and teams. The Lithuanian education system. | | |

| KIFSB17107 | PHILOSOPHY | | 3 ECTS |
|---|---|---|---|
| **Lectures** – 8 hours/semester | **Practical works** – 4 hours/semester | **Consultations** – 2 hours/semester | **Individual work** - 66 hours/semester |
| **Course aim** | The course is intended to introduce students to the basic problems of philosophy and to provide with skills for critical thinking. | | |
| **Course description** | The course examines the origin of philosophy and the role of philosophy in the development of European cultural history. Course presents the topics of being, the nature of things and ideas, knowledge, the relationship between science and philosophy, the human place in cosmos, in a society and in the state. The main focus is placed upon antique philosophy and its subsequent interpretations. | | |

| KIFSB17108 | PHILOSOPHY | | 3 ECTS |
|---|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – N/A | **Consultations** – 2 hours/semester | **Individual work** - 48 hours/semester |
| **Course aim** | The course is intended to introduce students to the basic problems of philosophy and to provide with skills for critical thinking. | | |
| **Course description** | The course examines the origin of philosophy and the role of philosophy in the development of European cultural history. Course presents the topics of being, the nature of things and ideas, knowledge, the relationship between science and philosophy, the human place in cosmos, in a society and in the state. The main focus is placed upon antique philosophy and its subsequent interpretations. | | |

| KIFSB17109 | PHILOSOPHY | | 3 ECTS |
|---|---|---|---|
| **Lectures** – 15 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 2 hours/semester | **Individual work** - 48 hours/semester |
| **Course aim** | The course is intended to introduce students to the basic problems of philosophy and to provide with skills for critical thinking. | | |
| **Course description** | The course examines the origin of philosophy and the role of philosophy in the development of European cultural history. Course presents the topics of being, the nature of things and ideas, knowledge, the relationship between science and philosophy, the human place in cosmos, in a society and in the state. The main focus is placed upon antique philosophy and its subsequent interpretations. | | |

| KIFSA17003 | PHILOSOPHY | | 3 ECTS |
|---|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – N/A | **Consultations** – 2 hours/semester | **Individual work** - 48 hours/semester |
| **Course aim** | The course is intended to introduce students to the basic problems of philosophy and to provide with skills for critical thinking. | | |
| **Course description** | The course examines the origin of philosophy and the role of philosophy in the development of European cultural history. Course presents the topics of being, the nature of things and ideas, knowledge, the relationship between science and philosophy, the human place in cosmos, in a society and in the state. The main focus is placed upon antique philosophy and its subsequent interpretations. | | |

| ELKRB16404 | COMPUTER ENGINEERING PRACTICUM | 3 ECTS |
|---|---|---|
| **Lectures** – N/A | **Practical works** – N/A | **Consultations** – 2 hours/semester |
| **Laboratory works** – 30 hours/semester | **Individual work** - 48 hours/semester | |
| **Course aim** | The aim of this course is to understand the operation of semiconductor devices, to design electronics circuits and printedcircuit boards, to perform assembly, testing and research of these printed circuits boards. | |
| **Course description** | Computer engineering practicum delivers knowledge and practical skills about circuit schematic component and footprintlibrary creation, circuit schematic design, printed circuit board design, soldering and assembling, and about advancedprinted circuit board design. | |

| ELKRB16201 | COMPUTER LOGIC | 3 ECTS |
|---|---|---|
| **Lectures** – 15 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 2 hours/semester |
| **Laboratory works** – N/A | **Individual work** - 48 hours/semester | |
| **Course aim** | To acquaint students' with basic concepts of computer logic and develop ability to solve typical problems of discrete mathematics. | |
| **Course description** | Propositional Calculus, Truth Table, Logical Circuits, Predicate Calculus, Predicate and Quantifiers, De Morgan laws, Statements with Quantifiers, Elementary Number Theory, Proof Theory, Methods of Proof, Contradiction and Contraposition, Algorithms, Sequences, Mathematical Induction, and Recursion, Correctness of Algorithms, Recursion of Sequences, Set Theory, Operations on Sets, Boolean Algebras, Russell's Paradox, Efficiency of Algorithms, Analysis of Algorithms' Complexity. | |

| ELKRB16617 | COMPUTER PERIPHERALS | 3 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – N/A | **Consultations** – 2 hours/semester |
| **Laboratory works** – 15 hours/semester | **Individual work** - 33 hours/semester | |

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| **Course aim** | Learn to develop, improve and apply the modern tools of communication and interaction between computers and various hardware components, so that they can exchange data, communicate with each other and send messages and commands, develop the ability to apply the acquired knowledge in engineering practice. |
| **Course description** | In the Computer Peripherals subject knowledge about data communication principles, data communication systems and their characteristics, protocols and protocols architecture, interfaces for PC and peripheral devices, data encoding and modulation techniques, serial data interfaces, microcontroller interfacing techniques, IrDA and Bluetooth technology, modems and power supply units is provided. |

| ELKRB16202 | DATABASES | 3 ECTS |
|---|---|---|
| **Lectures** – 15 hours/semester | **Practical works** – N/A | **Consultations** – 2 hours/semester |
| **Laboratory works** – 15 hours/semester | **Individual work** - 48 hours/semester | |
| **Course aim** | To understand the physical, conceptual and logical database (DB) organization. Learn to design relational DB and their support, learn relational algebra and relational computing language SQL. | |
| **Course description** | In Databases course the main database (DB) design phases, the canonical schemes and principles of their creation and use are presented. The focus is on the management of relational databases. Briefly discussed the models of DB logical structure, operations of relational algebra and the SQL language, used for their description. The design of relational databases is trained. Self-sufficiency and responsibility during studying, the thoroughness of work and time planning is trained. | |

| ELKRB16822 | INTERNET TECHNOLOGIES | 3 ECTS |
|---|---|---|
| **Lectures** – 24 hours/semester | **Practical works** – N/A | **Consultations** – 2 hours/semester |
| **Laboratory works** – 12 hours/semester | **Individual work** - 42 hours/semester | |
| **Course aim** | To learn to develop, improve and apply the decisions based on Internet technologies as in information systems of a general purpose, and specialized systems with the WEB-interface, about also to be able is given reason to prove decisions, working independently and in group. | |
| **Course description** | At studying a Internet technologies subject are acquired knowledge of the basic protocols of TCP/IP stack, of WEB-technologies (static, dynamic, and active WEB-documents), technologies of transfer of files, e-mail, p2p-networks, security of networks, access to a Internet network, commercial use Internet. | |

| ELKRB16612 | MICROPROCESSORS | 6 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – N/A | **Consultations** – 4 hours/semester |
| **Laboratory works** – 30 hours/semester | **Individual work** - 96 hours/semester | |
| **Course aim** | To provide students with sufficient knowledge about general and special purpose microprocessors, to develop the need to be interested in microprocessor systems programming, to develop the ability to apply the acquired knowledge in engineering practice and to develop the ability to maintain their professional competence through lifelong learning. | |
| **Course description** | In the microprocessors course knowledge about microprocessor systems, their creation principles and architectures, concepts of microprocessors, general and special purpose microprocessors structures, their operation principle, data and instruction formats, operand addressing modes, memory organization, instruction set, and modern microprocessors technologies are provided. | |

| ELKRB16823 | MICROTECHNOLOGIES | 3 ECTS |
|---|---|---|
| **Lectures** – 24 hours/semester | **Practical works** – N/A | **Consultations** – 2 hours/semester |
| **Laboratory works** – 12 hours/semester | **Individual work** - 42 hours/semester | |
| **Course aim** | Teach to understand, analyze and simulate processes of microtechnologies and develop skills to choose a reasoned decision, an independent or in group. | |
| **Course description** | Acquiring knowledge of the key technological processes for embedded computers(EC) and systems manufacturing technologies: methods of formation geometry components by lithografies and wet and dry removal processes, doping an deposition, interconnection and packing technologies, challenges of microtechnologies and future features and developed abilities to analyze and simulate microtechnology processes and EC elements. | |

| ELKRB16613 | MICROWAVE TECHNOLOGY | 3 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – N/A | **Consultations** – 2 hours/semester |
| **Laboratory works** – 15 hours/semester | **Individual work** - 33 hours/semester | |
| **Course aim** | To soak up peculiarities of microwave band, pick up to design antennas, microwave transmission lines with due properties, make reasoned solutions on one's own and with group. | |

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| **Course description** | Microwave technologies subject gives knowledge about propagation of radio waves around Earth surface, elementary and real antennas, microwave transmission lines. |

| ELEIB16661 | AUTOMATIC CONTROL DEVICES AND SYSTEMS | 6 ECTS |
|---|---|---|
| **Lectures** – 45 hours/semester | **Practical works** – N/A | **Consultations** – 4 hours/semester |
| **Laboratory works** – 15 hours/semester | **Individual work** - 96 hours/semester | |
| **Course aim** | Gain knowledge of principles, structure, elements and applications of automatic control devices and systems, acquire skillsin experimental investigation of control systems. | |
| **Course description** | Principles of automatic control. Linear, nonlinear, pulse and adaptive automatic control systems. Theory, construction,operation and application of electronic, electromechanical, hydromechanical and pneumatic control systems. | |

| ELEIB16562 | AUTOMATIC CONTROL SYSTEMS (WITH COURSE PROJECT) | 6 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 4 hours/semester |
| **Laboratory works** – 15 hours/semester | **Individual work** - 96 hours/semester | |
| **Course aim** | Provide knowledge about design and analysis strategies of automatic control systems, design controllers matching specificationsof closed loop control system, acquire ability to apply those for control of various dynamic systems and be able to use advancedinformational technologies for assessment results of automatic control systems synthesis and analysis. | |
| **Course description** | Automatic control theory provides knowledge about design strategies of automatic control systems: open loop and closed loopsystems, disturbance compensating systems and feedback control systems, the basis of mathematical models of systems:differential equations of linear systems, analysis in time domain, Laplace transform, transfer functions and stability analysis infrequency domain (Mikhailov, Nyquist methods) and Bode diagrams; and knowledge, required for system synthesis: principles ofdesign proportional, integral, integral proportional and proportional integral derivative controllers and compensating elements;knowledge about modeling of transient processes using MATLAB software. | |

| ELEIB16252 | ELECTRICAL ENGINEERING | 6 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 4 hours/semester |
| **Laboratory works** – 15 hours/semester | **Individual work** - 96 hours/semester | |
| **Course aim** | Provide knowledge about linear direct current circuits, single-phase alternating current circuits and three-phase cir-cuits; develop the ability to apply the acquired knowledge in engineering activities; acquire the experience of practi-cal investigation, develop the abilities to analyze electric circuits; develop the abilities to analyze electric circuits using computer; acquire the ability to work individually and in group. | |
| **Course description** | Basic concepts of electrical circuits. Direct current circuits laws, algebraic methods for circuit analysis. Circuit's properties, characteristics, change. One-ports. Sinusoidal electric values, main characteristics, phasors diagrams. Idealized circuit elements. Series and parallel connection of elements. Voltage and current resonances. Analysis of sinusoidal electric circuits. Alternating circuit power. Energy Supply. Mutual inductance circuits. Three-phase circuits: connection modes, analysis. | |

| ELEIB16251 | ELECTRICAL ENGINEERING | 6 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 4 hours/semester |
| **Laboratory works** – 15 hours/semester | **Individual work** - 96 hours/semester | |
| **Course aim** | Provide knowledge about linear direct current circuits, single-phase alternating current circuits and three-phase circuits; develop the ability to apply the acquired knowledge in engineering activities; acquire the experience of practi-cal investigation, develop the abilities to analyze electric circuits; develop the abilities to analyze electric circuits using computer; acquire the ability to work individually and in group. | |
| **Course description** | Basic concepts of electrical circuits. Direct current circuits laws, algebraic methods for circuit analysis. Circuit's properties, characteristics, replacing. Two-ports. Sinusoidal electric values, main characteristics, phasors diagrams. Idealized circuit elements. Series and parallel connection of elements. Voltage and current resonances. Analysis of sinusoidal electric circuits. Alternating circuit power. Energy Supply. Mutual inductance circuits. Three-phase circuits: connection modes, analysis. | |

| ELEIB16403 | ELECTRICAL ENGINEERING | 3 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – N/A | **Consultations** – 2 hours/semester |
| **Laboratory works** – 15 hours/semester | **Individual work** - 33 hours/semester | |

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| **Course aim** | Provide knowledge about linear DC, AC single-phase and three-phase circuits, transients in linear DC and AC circuits, magneticcircuits. Develop the ability to experimentally investigate and develop these circuit using various methods. |
| **Course description** | Basic circuit concepts. DC circuit laws, algebraic circuit analysis. Sinusoidal electrical quantities. Idealized circuit elements.Sequential and parallel circuit elements. Resonance phenomena. Sinusoidal AC circuit analysis. Sinusoidal AC powercircuits.Transition Processes, magnetic circuits. |

| ELEIB16651 | HUMAN SAFETY | 3 ECTS |
|---|---|---|
| **Lectures** – 15 hours/semester | **Practical works** – N/A | **Consultations** – 2 hours/semester |
| **Laboratory works** – 15 hours/semester | **Individual work** - 48 hours/semester | |
| **Course aim** | To provide knowledge about legal - normative work safety organization principles, electric current hazard criterias and safetymeasures, work environment design key indicators, occupational risk assessment aspects, accident investigation and accounting, firesafety organization principles, to apply the acquired knowledge in solving engineering management issues, to develop broadexpertise, to have an ability to critically analyze and develop creative solutions for professional challenges. | |
| **Course description** | Introduction to the subject matter of the issues. The legal protection of people - a legislative regulation. Safety of human activities.Risks and their classification. General work safety. Occupation safety. Electrical protection. Accident investigation Features. | |

| ELEIB16861 | INDUSTRIAL LOGICAL CONTROLLERS | 3 ECTS |
|---|---|---|
| **Lectures** – 24 hours/semester | **Practical works** – N/A | **Consultations** – 2 hours/semester |
| **Laboratory works** – 12 hours/semester | **Individual work** - 42 hours/semester | |
| **Course aim** | Gaining theoretical and practical knowledge about modern programmable logic controller types, structure, programming and application of automated systems and mechatronic systems. | |
| **Course description** | PLC definition, design, structure, operation, software tools and the structure of the programming components, the IEC 61131 standard programming language. | |

| ELEIB20801 | POWER NETWORKS AND CONTROL SYSTEMS OF BUILDINGS | 6 ECTS |
|---|---|---|
| **Lectures** – 36 hours/semester | **Practical works** – 12 hours/semester | **Consultations** – 4 hours/semester |
| **Laboratory works** – 12 hours/semester | **Individual work** - 96 hours/semester | |
| **Course aim** | To teach the basic laws of automatic control, electronics and electrical engineering, electrical and electronic devices and equipment operating principles, to develop skills for independent automatic control, electrical and electronics issues, to explain the principles of operation of digital electronics and application areas. | |
| **Course description** | Process control system elements. Automation types. Automatic control system structure. Direct and. DC and AC units. Single-phase and three-phase AC units. Transition processes. Transformers. Electrical measurements. Electrical measurements of non-electrical quantities. Electrical machinery. Technological equipment for power transmission and control. Electronic elements. p-n junction. AC rectifiers. Electronic amplifiers. Digital devices, sensors and transducers. | |

| ELEIB16206 | SMART ELECTRICAL AND ELECTRONICS SYSTEMS OF BUILDINGS | 3 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – N/A | **Consultations** – 2 hours/semester |
| **Laboratory works** – 15 hours/semester | **Individual work** - 33 hours/semester | |
| **Course aim** | Provide electrical engineering knowledge, develop the ability to creatively analyse and solve electrical issues. | |
| **Course description** | Direct current circuits. Alternating current circuits. Circuits of a single-phase and three-phase current. Transformers. Electronic components and equipment. Electrical machines. Electric drives of technological devices and their control equipment. Protection against electric. | |

| ELESB16604 | COMPUTER NETWORKS | 6 ECTS |
|---|---|---|
| **Lectures** – 45 hours/semester | **Practical works** – N/A | **Consultations** – 4 hours/semester |
| **Laboratory works** – 15 hours/semester | **Individual work** - 96 hours/semester | |
| **Course aim** | The aim of the subject is to acquire knowledge on the computer network fundamentals, acquire the abilities to describe structure,architecture and operation of computer networks, to investigate topology and function of a network, to plan and develop acomputer network, carry out the tasks of network administration. | |

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| **Course description** | Subject focuses on common OSI model, principles of data exchange (communication medium, data coding, data transmissioninterface, control of the data transmission channel, data compression). The protocols of the computer network are reviewed (theprotocols of interaction between computer networks, transport protocols). The term LAN is introduced, the LAN technology, LANsystems are analyzed in this subject. The term WAN is introduced, the channel switching, packet switching technologies, ATMand Frame Relay protocols are analyzed. The subject also focuses on the security of the computer network, distributed computernetwork systems, tools for computer network administration. |

| ELESB16401 | ELECTRONIC DEVICES | 3 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – N/A | **Consultations** – 2 hours/semester |
| **Laboratory works** – N/A | **Individual work** - 48 hours/semester | |
| **Course aim** | Providing knowledge of matematics and physics and ability to apply knowledge in design and optimization of electronic devices. Providing knowledge of modern electronic devices and their applications in various fields of science and technology. Preparation for further studies of electronic circuits and other subjects. | |
| **Course description** | Introduction. Semiconductor diodes. Bipolar transistors. Field effect transistors. Thyristor devices. Semiconductor integrated circuits technology. Bulk and surface acoustic wave devices. Optoelectronic devices. Display devices. Summary. | |

| ELESB16612 | MICROCONTROLLERS SYSTEMS | 6 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – N/A | **Consultations** – 4 hours/semester |
| **Laboratory works** – 30 hours/semester | **Individual work** - 96 hours/semester | |
| **Course aim** | To provide students with sufficient knowledge of microcontroller architecture and programming and to develop the ability to applythat knowledge in engineering activities. To develop the need to seek for the knowledge of programming of embedded systems.To develop the ability to maintain their professional competence by life-long learning. | |
| **Course description** | The study module of microcontroller systems provides knowledge about 8 and 32 bit microcontrollers. The architecture ofmicrocontrollers is discussed in details: kernel, registers, memory types, general purpose and specific pins, interrupts, timers-counters, analog to digital converters. The communication interfaces are also presented in details. The programming ofperipheral devices such as sensors, displays, external memories, is discussed. | |

| ELESB16402 | SIGNALS AND CIRCUITS 1 | 6 ECTS |
|---|---|---|
| **Lectures** – 45 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 4 hours/semester |
| **Laboratory works** – N/A | **Individual work** - 96 hours/semester | |
| **Course aim** | To provide basic knowledge of linear circuits, to develop the ability to analyze, design and apply linear circuits in order to process simple forms signals and to be able to select the solutions reasonably by working independently or in a group. | |
| **Course description** | Interfaces of applications of superposition priciple with frequency characteristics of circuits, frequency characteristics of bipolar and quadripolar, frequency characteristics of RR, RC and RL, circuits which are connected in cascade, features of resonant circuits, quadripolars and their empty running, short operation and general parameters, electrical filters, circuits of distributed parameters. | |

| ELEIM17201 | CONTROL OF ELECTRICAL ENERGY SYSTEMS | 6 ECTS |
|---|---|---|
| **Lectures** – 42 hours/semester | **Practical works** – N/A | **Consultations** – 3 hours/semester |
| **Laboratory works** – N/A | **Individual work** - 115 hours/semester | |
| **Course aim** | Provide knowledge about control of electrical systems, elevate the practical skills to select and calculate the components of the electrical systems, optimize the power flow in electrical energetics systems. | |
| **Course description** | Module covers the theory of the control of the electrical systems, system operation mode planning, respective reglaments and standards, the power flow distribution tasks are overviewed and the skills to practically determine and select the electrical system components, based on the analytical and mathematical modelling are developed. | |

| ELEIM17204 | ELECTRONIC CONVERTERS (WITH COURSE PROJECT) | 9 ECTS |
|---|---|---|
| **Lectures** – 42 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 3 hours/semester |
| **Laboratory works** – N/A | **Individual work** - 180 hours/semester | |
| **Course aim** | To acquire the knowledge and competence in electronic converters, planning, design and operation. | |
| **Course description** | Principle of operation of electronic converters, analysis and design energy systems are described. | |

| ELEIM17203 | MODERN ELECTRICAL ENGINEERING | 6 ECTS |
|---|---|---|
| **Lectures** – 42 hours/semester | **Practical works** – N/A | **Consultations** – 3 hours/semester |
| **Laboratory works** – N/A | **Individual work** - 115 hours/semester | |
| **Course aim** | To acquire the knowledge and competence in modern electrical engineering, analisys, design and operation of modern electric systems. | |
| **Course description** | In Modern electrical engineering discipline students gain knowledge in principles of operation of modern electrical engineering equipment and smart electric grids, analysis and design. | |

| ELEIM19201 | SYSTEMOTECHNIQUE AND SENSORS | 6 ECTS |
|---|---|---|
| **Lectures** – 28 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 2 hours/semester |
| **Laboratory works** – N/A | **Individual work** - 115 hours/semester | |
| **Course aim** | To analyze principles of work of gauges and converters, to be able to project circuits of the automated measurement and control. | |
| **Course description** | Resistive, inductive, capacitor, photoelectric gauges used in power electronics. DAC and ADC. Microprocessors and use of him for processing the information and control. | |

| ELEIM17200 | SYSTEMOTECHNIQUE AND SENSORS | 6 ECTS |
|---|---|---|
| **Lectures** – 28 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 2 hours/semester |
| **Laboratory works** – N/A | **Individual work** - 115 hours/semester | |
| **Course aim** | To analyze principles of work of gauges and converters, to be able to project circuits of the automated measurement and control. | |
| **Course description** | Resistive, inductive, capacitor, photoelectric gauges used in power electronics. DAC and ADC. Microprocessors and use of him for processing the information and control. | |

| APPEB16404 | HEAT AND MASS TRANSFER | 6 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 4 hours/semester |
| **Laboratory works** – 15 hours/semester | **Individual work** – 96 hours/semester | |
| **Course aim** | To form the basis for further study the building energy program specialist knowledge assimilation, to develop capacity and skills to creatively use the basic heat and mass transfer patterns on specific heat and gas supply, heating, ventilation, air conditioning, heat production targets. | |
| **Course description** | Fundamental concepts of heat transfer. Steady state of heat transfer by conduction and heat transmission. Free and forced convection. Convection with change of phase of fluid. Heat transfer by thermal radiation. Unsteady heat transfer. Heat exchangers and their calculations. Mass transfer. | |

| APPEB16407 | INDOOR CLIMATE (WITH COURSE PROJECT) | 6 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 30 hours/semester | **Consultations** – 4 hours/semester |
| **Laboratory works** – N/A | **Individual work** – 96 hours/semester | |
| **Course aim** | To acquire and assimilate knowledge about building indoor climate - why it is important, what depends on it, what influence it, which parameters describe it, how it should be created and supported and how much of energy does it require. To understand the relations between indoor climate parameters, influencing factors and energy requirement in context of sustainable development and rational energy use.To learn and to get practical skills of evaluating of building characteristics, calculating. | |
| **Course description** | During this course the building indoor climate is comprehensively analysed - why it is important, what depends on it, what influence it, which parameters describe it, how it should be created and supported and how much energy does it require. The creation and supporting of necessary indoor climate is analysed using sustainable development principles - how to reach today's objectives without harming the welfare of future generations. During the practical exercises students learn to evaluate the building characteristics, calculate the necessary power of building indoor climate systems and annual energy amount needed for supporting the desired indoor climate. | |

| APAVB19403 | ATMOSPHERE PROTECTION (WITH COURSE WORK) | 6 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 4 hours/semester |
| **Laboratory works** – 15 hours/semester | **Individual work** – 96 hours/semester | |
| **Course aim** | To gain a theoretical knowledge on atmosphere pollution control and reduction methods; to formulate professional skills for independent work with air pollution control and air cleaning from solid particles and chemical pollutants equipment, permitting to analyze professionally air pollution and to apply pollution reduction measures. | |
| **Course description** | Study subject acquired knowledge about sources of air pollution, situations and trends in Lithuania and in other countries, solid particles, their chemical properties and methods of evaluation. Methods and apparatus of solid particles evaluation, metrology of apparatus, physical measurements of air flow, methods and equipment of air cleaning from pollutants, methods and equipment for air cleaning from chemical pollutants, determination of air cleaning equipment efficiency, exploitation of air cleaning equipment, security techniques and experiment, normative documents, EU directives, air pollution on human health. | |

| APAVB19404 | WASTE MANAGEMENT AND REUSE TECHNOLOGIES (WITH COURSE PROJECT) | 6 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 30 hours/semester | **Consultations** – 4 hours/semester |
| **Laboratory works** – N/A | **Individual work** – 96 hours/semester | |
| **Course aim** | To know about the sources of waste generation, waste reduction, and factors which may affect them, and the main characteristics of the waste handling methods and technologys. Understand the principles of sustainable environmental waste management. Know the principles of recycling, sorting machines, and technology. To become proficient in self-organize their work in solving practical problems of waste management system. | |
| **Course description** | Study subject knowledge acquired on the generation, sources of waste type and composition of the physical, chemical and biological properties of the waste management principles, legal framework and priorities for the management of waste collection, mechanical, biological and thermal treatment, waste disposal in landfills, hazardous waste and their sources of generation, re-use of waste and waste management in the context of sustainable development. | |

| APGDB16054 | ENGINEERING GEODESY | 3 ECTS |
|---|---|---|
| **Lectures** – 15 hours/semester | **Practical works** – N/A | **Consultations** – 2 hours/semester |
| **Laboratory works** – 30 hours/semester | **Individual work** – 33 hours/semester | |

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| **Course aim** | Gaining knowledge of mathematical models of the Earth, coordinates and elevation systems. Learning to read maps, topographical plans. To be able to select the appropriate measurement method and apparatus engineering geodetic surveying tasks. |
| **Course description** | Geodesy: the scientific origin, evolution, branches. Land mathematical models, coordinates, elevation systems, guidance angles. Geodetic networks heights basis. Maps, plans. Horizontal, vertical, general plans, the use of devices. Tracks, area leveling. Profile. The static points planimetric and height layout, other marking works. Building elements of control measurements. Geodetic instrument conditions verification devices Preparing measurements. |

| APGDB16052 | ENGINEERING GEODESY | 3 ECTS |
|---|---|---|
| **Lectures** – 15 hours/semester | **Practical works** – N/A | **Consultations** – 2 hours/semester |
| **Laboratory works** – 30 hours/semester | **Individual work** – 33 hours/semester | |
| **Course aim** | Gaining knowledge of mathematical models of the Earth, coordinates and elevation systems. Learning to read maps, topographical plans. To be able to select the appropriate measurement method and apparatus engineering geodetic surveying tasks. | |
| **Course description** | Geodesy: the scientific origin, evolution, branches. Land mathematical models, coordinates, elevation systems, guidance angles. Geodetic networks heights basis. Maps, plans. Horizontal, vertical, general plans, the use of devices. Tracks, area leveling. Profile. The static points planimetric and height layout, other marking works. Building elements of control measurements. Geodetic instrument conditions verification devices Preparing measurements. | |

| APAVM20107 | ANTHROPOGENIC IMPACT ON ENVIRONMENT | 6 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – N/A | **Consultations** – N/A |
| **Laboratory works** – 15 hours/semester | **Individual work** – 115 hours/semester | |
| **Course aim** | SDM is intended for deepening student knowledge about anthropogenic impact on environment and assessment of technosphere pollution level. This is achieved by gaining understanding about related risk and threats, developing abilities to work independently and in a team, using critical thinking for identification of problems and applying rational thinking in search of their solution. | |

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| **Course description** | Study discipline module (SDM) will help students to deepen knowledge about anthropogenic impact on environment, associated risk and the level of extent of threat. Students will gain special abilities to minimize anthropogenic impact. Students will gain general abilities to deepen and structure the knowledge; to fulfill assigned task(s) and prepare for assessments independently during the semester; to think and assess situations critically; to work in a team; to prepare work tasks carefully and clearly; to submit work results systematically and clearly using visual aids. |

| APAVM17140 | ENVIRONMENTAL MANAGEMENT (WITH COURSE PROJECT) | 9 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 30 hours/semester | **Consultations** – N/A |
| **Laboratory works** – N/A | **Individual work** – 180 hours/semester | |
| **Course aim** | The aim of this study subject is to present the main issues related to the development of the international environmental management organization and to emphasize the role of documents on environmental management in Lithuania and worldwide. | |
| **Course description** | Study subject knowledge acquired on the main issues related to international environmental management organization, the development of it, the role of documents of environmental management in the world and in Lithuania. This study subject is relevant as the environment management in any company becomes increasingly important in this world. An environmental management system addresses environmental concerns throughout an installation operations in organizations, including environmental auditing, international environmental management organization series of documents for environmental labelling, environmental performance evaluation, life-cycle assessment, environmental policy and other further tools of the environmental management. | |

| APAVM17141 | WASTE MANAGEMENT (WITH COURSE WORK) | 9 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 30 hours/semester | **Consultations** – N/A |
| **Laboratory works** – N/A | **Individual work** – 180 hours/semester | |
| **Course aim** | SDM is intended for deepening student knowledge about underlying waste management methods and their performance assessment in the context of sustainable development. This is achieved by gaining understanding about related risk and threats, developing abilities to work independently and in a team, using critical thinking for identification of problems and applying rational thinking in search of their solution. | |

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| **Course description** | Study discipline module (SDM) will help students to deepen knowledge about underlying waste management methods and their performance assessment in the context of sustainable development. Students will gain special abilities to find solution for the waste management problem using modern informative technologies. Students will gain general abilities to deepen and structure the knowledge; to fulfill assigned task(s) and prepare for assessments independently during the semester; to think and assess situations critically; to work in a team; to prepare work tasks carefully and clearly; to submit work results systematically and clearly using visual aids. |

| APGDM17044 | GEOINFORMATION SYSTEMS TECHNOLOGY | 6 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – N/A | **Consultations** – N/A |
| **Laboratory works** – 15 hours/semester | **Individual work** – 115 hours/semester | |
| **Course aim** | Prepare specialists of measurement engineering who obtained latest knowledge related to the technologies of the geoinformation systems, being able to understand, analyse and rise the problematic questions on the technologies of the geoinformation systems, with involving to their solutions the methods of the information technologies, creation and development of the geodetic control. | |
| **Course description** | Variety of Technologies of Geoinformation Systems. The core of real phenomena model and data models of Geoinformation Systems. Geometrical and attribute data. Topology of data of Geoinformation Systems. Archiving, upgrading, quality and safety of the data. Standards of Geoinformation Systems. Thematic data of Geoinformation Systems. The usage of Geoinformation Systems for thematic mapping. | |

| APKLM93001 | INNOVATIVE SCIENTIFIC SOLUTIONS | 3 ECTS |
|---|---|---|
| **Lectures** – 15 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – N/A |
| **Laboratory works** – N/A | **Individual work** – 50 hours/semester | |
| **Course aim** | Learn about the peculiarities of research organization and planning and understand the basics of innovation. | |
| **Course description** | To acquaint with the development of scientific research, diversity, levels of scientific cognition, scientific classification, organization of scientific research, planning, innovation policy. Ability to apply theoretical knowledge in practical activities, preparing for Master's or Doctor's degree. Introduces the possibilities of preparing publications, financing of innovations and protection and management of intellectual property. | |

| APKLM93101 | SCIENTIFIC RESEARCHES IN ROAD ENGINEERING | 3 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – N/A | **Consultations** – N/A |
| **Laboratory works** – 15 hours/semester | **Individual work** – 35 hours/semester | |
| **Course aim** | To provide the necessary knowledge for scientific activities and to develop skills to present and publish science-based research in road engineering. | |
| **Course description** | The study subject includes methodological bases of scientific and engineering research. Provides basic scientific research knowledge covering different ways to collect, proceed, analyse, and present information and data. Within the framework of the course students plan, perform and present future, existing or already performed scientific research by preparing a part of the scientific research report or scientific paper and presentation in the topic of road engineering. | |

| APKLM92201 | SUSTAINABLE MOBILITY | 3 ECTS |
|---|---|---|
| **Lectures** – 15 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – N/A |
| **Laboratory works** – N/A | **Individual work** – 50 hours/semester | |
| **Course aim** | To introduce students with the concept of habitants' mobility management, its measures, criterias and evaluation of mobility management objects, to provide with practical skills for analytical job and particular decisions making. | |
| **Course description** | The main topics of the course are raising the visions of sustainable mobility in cities and towns, identifying the main problems of transport systems, identifying target groups and communicating with them. Measures to promote selected modes of transport. | |

| APKLM93301 | URBAN PUBLIC TRANSPORT | 3 ECTS |
|---|---|---|
| **Lectures** – 15 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 2 hours/semester |
| **Laboratory works** – N/A | **Individual work** – 48 hours/semester | |
| **Course aim** | To familiarise the graduate students familiarised with the social communications and engineering infrastructure, and its managment conception, measures and ways. To apply those measures in drafting specific planning documents. | |

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| **Course description** | Introduce the students to the conception, goals and tasks of the urban public transport, modes and structure of transport system in urban and rural areas, Sustainable urban mobility and the need for a public transport system in the city, new modes of public transport. Also they will get knowledge about the principles of Route Network Development, route system formation, ticketing system selection, accessibility of the public transport system for the disabled people, how to rule the public transport system under market conditions and promotion of public transport in different countries. |

## FUNDAMENTAL SCIENCES FACULTY

| FMCHB16204 | BIOLOGY | 6 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 30 hours/semester | **Consultations** – 4 hours/semester |
| **Laboratory works** – N/A | **Individual work** – 96 hours/semester | |
| **Course aim** | To introduce to the principles of biology: the cell structure, cell structure elements and function organization, genomes organization, chromosomal basis of inheritance, DNA as genetic material, origin of life and evolution, molecular tools. | |
| **Course description** | Exploring life on its different levels. The chemistry of life and the structure of procariotic and eucariotic cell. The eucarytoic cell cycle, mitosis and meiosis. The role of meiosis in an organism life cycle. G. Mendel's discoveries. Mendelian inheritance in humans. Basics of human genetics. DNA as the genetic material, DNA replication. The chemical structure and function of carbohydrates, lipids and proteins. Concept of transcription and translation. The organization of eukaryotic genomes. DNA cloning and practical application. An introduction to the viruses, viroids and bacteriophage, their genomes and reprodutcion. The evoliution of populations, the factors affecting the evolution. | |

| FMCHB19401 | CHEMICAL KINETICS | 6 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 4 hours/semester |
| **Laboratory works** – 30 hours/semester | **Individual work** – 81 hours/semester | |
| **Course aim** | Introduction to chemical kinetics and its applications. | |

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| **Course description** | Main concepts of chemical kinetics. Formal kinetics: rate equations of elementary and complex chemical reactions. Rate dependence of temperature, energy of activation. Dynamics of chemical reactions: effective collisions and transition state theories. Marcus electron transfer theory. Electrode processes. Bioelectrocatalytic systems. Kinentics of DNA/RNA and protein synthesis. |

| FMCHB16202 | CHEMISTRY | 3 ECTS |
|---|---|---|
| **Lectures** – 15 hours/semester | **Practical works** – N/A | **Consultations** – 2 hours/semester |
| **Laboratory works** – 15 hours/semester | **Individual work** – 48 hours/semester | |
| **Course aim** | To provide the students with chemistry knowledge necessary in the studies of the general and special courses as well as in the practice activities. | |
| **Course description** | Introduction to the course studies. Dissolution of materials and formation of solutions. Expression of solution concentration and methods for it's calculation. Electrolytical dissociation in the electrolyte solutions. Oxydation-reduction processes in electrolyte solutions. Electrochemical processes within galvanic cells, electrolysis and corrosion of metals, the methods of protection the metals against corrosion. | |

| FMCHB19402 | CHEMISTRY OF NATURAL COMPOUNDS | 9 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 30 hours/semester | **Consultations** – 6 hours/semester |
| **Laboratory works** – 30 hours/semester | **Individual work** – 144 hours/semester | |
| **Course aim** | Aware of the biologically important organic substances (proteins, carbohydrates, lipids, DNA and RNA, bioreguliators). | |
| **Course description** | Chemistry and bioorganic chemistry of amino acids. Carbohydrates. Components of nucleic acids and general structure of RNA and DNA. Lipids. Naturally occurring biologically active compounds. Enantioselective transformations, topicity of reactions. Enzyme catalysed organic reactions. Enzyme models. Structure determination methods of bioorganic molecules. | |

| FMCHB19404 | FUNDAMENTALS OF MICROBIOLOGY | 6 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 4 hours/semester |
| **Laboratory works** – 30 hours/semester | **Individual work** – 81 hours/semester | |

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| **Course aim** | To indoctrinate with fundamentals of of microbiology: scope of microbiology, characracteristics of prokaryotic and eukaryotic microorganisms, growth, culturing and metabolism of bacteria, microbial genetics, main reseach methods, classification of microorganisms; ecology and application of microbes in industry. |
| **Course description** | The diversity of microorganisms and their distribution in nature. Eukaryotic and prokaryotic cells, comparison of structure. Archaebacteria and Eubacteria. Systematics of microorganisms. Propagation and growth conditions of microorganisms, methods for their cultivation, physiology of microorganisms. Metabolism of microorganisms, biosynthesis. Ecology, symbiosis and evolution of microorganisms. Application of microorganisms in industrial microbiology. |

| FMIGB17001 | GENERAL AND APPLIED ENGINEERING GRAPHICS | 6 ECTS |
|---|---|---|
| **Lectures** – 15 hours/semester | **Practical works** – 30 hours/semester | **Consultations** – 4 hours/semester |
| **Laboratory works** – 15 hours/semester | **Individual work** – 96 hours/semester | |
| **Course aim** | To present graphical problems solving algorithms, to develop abilities to read and make engineering drawings, adapting theoretical knowledge and according to drawing standards requirements and also to manage computer - aided design tools, to develop spatial imagination. | |
| **Course description** | Drawing devices, tools and accessories. Formation of drawings: standards, scales, lines, fonts. Projection methods, projections of points, lines and planes. Projection of parts into three projection planes; viewing of international holes, cavity; views and their displacement in drawings; sections, incomplete sectional views, enlarged part view elements, corditionalities and simplifications. Solid modeling according to pictorial projections and to the views given. Surface modeling. Surfaces intersection and their developments. | |

| FMIGB16203 | GENERAL ENGINEERING AND DIGITAL GRAPHICS | 6 ECTS |
|---|---|---|
| **Lectures** – 15 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 4 hours/semester |
| **Laboratory works** – 30 hours/semester | **Individual work** – 96 hours/semester | |
| **Course aim** | To present the general engineering and computer graphics fundamentals necessary in civil engineering design. To acquaintance with basic methods of general descriptive geometry, principles of orthographic projections, design methods, to introduce with modern computer aided design systems. Projection drawing. Views, arrangement of views in drawings. Simple and complex sections. | |

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| **Course description** | The basic practice of engineering graphic in computer aided design systems. Software review, possibilities. Preparation of constructions, mechanicals and other drawing types. Percularyties of drawing arrangement. Drawings standards. Modeling of 2D drawings, objects projections in one plane. General methods of the composition of volumetric models. Basis of 3D modeling. Represenatation of 3D objects, arrangement of prejections. Surfaces, peculiarities of modeling of surfaces. Projection drawing. Views, arrangement of views in drawings. Simple and complex sections. |

| FMIGB16202 | GENERAL ENGINEERING GRAPHICS | 3 ECTS |
|---|---|---|
| **Lectures** – 6 hours/semester | **Practical works** – 6 hours/semester | **Consultations** – 2 hours/semester |
| **Laboratory works** – 6 hours/semester | **Individual work** – 60 hours/semester | |
| **Course aim** | To present graphical problems solving algorithms, to develop abilities to read and make engineering drawings, adapting theoretical knowledge and according to drawing standards requirements and also to manage computer - aided design tools, to develop spatial imagination. | |
| **Course description** | Module contains the information about general principles of drawing making, standards applying, theoretical basic of engineering graphics and about computer modeling potentialities. | |

| FMGSB18210 | GRAPHIC PROGRAMMING FOR MOBILE DEVICES | 6 ECTS |
|---|---|---|
| **Lectures** – 15 hours/semester | **Practical works** – 30 hours/semester | **Consultations** – 4 hours/semester |
| **Laboratory works** – N/A | **Individual work** – 111 hours/semester | |
| **Course aim** | 1) Work with user interface prototyping software for mobile devices; 2) Create interface prototypes for mobile devices; 3) Choose interface styles for different mobile device platforms; 4) Work independently. | |
| **Course description** | Current progress of technology enables almost everybody to have a mobile phone. Very often, the phone is used not only for its primary function, but for various other tasks, essentially it becomes multifunctional mobile device. Graphical possibilities of these devices are discussed in the module. | |

| FMGSB19201 | MEDIA PRODUCTION | 6 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 30 hours/semester | **Consultations** – 2 hours/semester |
| **Laboratory works** – N/A | **Individual work** – 98 hours/semester | |

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| **Course aim** | This course will provide students with such knowledge: 1) Terminology and definitions used in audiovisualy industry; 2) Screenwriting for short films: structure & dramaturgy; Industry standart script formatting; 3) Audio and video equipment - theoretical knowledge ant practical skills; 4) Video editing - basics of using Adobe Premiere software; 5) Film crew: Roles and responsibilities; 6) Various media forms (advertising, music video clips, etc.) and their application. |
| **Course description** | "Media production" provides students with a general knowledge on audiovisual arts industry. Module introduces all stages of film production - development, production, editing and postproduction. Students gain theoretical and practical knowledge on using audio and video equipment, develop practical video editing, scriptwriting skills. |

| FMISB19600 | ARTIFICIAL INTELLIGENCE AND KNOWLEDGE SYSTEMS | 3 ECTS |
|---|---|---|
| **Lectures** – 24 hours/semester | **Practical works** – N/A | **Consultations** – 2 hours/semester |
| **Laboratory works** – 12 hours/semester | **Individual work** – 42 hours/semester | |
| **Course aim** | Learning of an advanced topics in the artificial inteligence and its information systems related applications. | |
| **Course description** | The role of AI in IS, knowledge representation and reasoning, application of knowledge-based systems in IS, problem solving andagents, planning, simple planningagents, application of software agents in IS, distributed AI and agents societies, swarmintelligence and its application in IS, learning, application of learning in IS,other modern AI methods and their application in IS. | |

| FMISB18600 | ELECTRONIC OPERATION SYSTEMS | 6 ECTS |
|---|---|---|
| **Lectures** – 36 hours/semester | **Practical works** – N/A | **Consultations** – N/A |
| **Laboratory works** – 24 hours/semester | **Individual work** – 100 hours/semester | |
| **Course aim** | To provide knowledge of transactions and electronic payment solutions used in modern systems, being able to apply them inpractice. | |
| **Course description** | Provides general knowledge of electronic operations, transactions and their usage. Introduction to the monetary system, itsdifferent types and electronic payment methods. Electronic payments are analyzed from the point of view of both operation andimplementation technologies, delving into the authentication solutions used by users and related devices. Much attention is paidto the mastering of the principles of the BlockChain (from the point of view of users, programmers, cashiers, exchange offices).Not only theoretical principles of BlockChains and cryptocurrencies, operating schemes and regulatory mechanisms areanalyzed, but also BlockChain programming technologies are examined and used. | |

| FMITB20601 | BASICS OF DISTRIBUTED SYSTEMS | 6 ECTS |
|---|---|---|
| **Lectures** – 24 hours/semester | **Practical works** – N/A | **Consultations** – 4 hours/semester |
| **Laboratory works** – 24 hours/semester | **Individual work** – 108 hours/semester | |
| **Course aim** | To teach students properly understanding of project management concept, as a view to modern method of management, to givetheoretical and practical knowledge about types of projects, their purposes, cycle of project implementation, structure of business(activities) plan, to provide knowledge on the principles of project team formation, peculiarities of supervisor selection, businessproject control and changes performance management, project risk evaluation and management methodology. | |
| **Course description** | Students will be introduced to principles of distributed systems, will analyze how can be distributed data within different systemsor services, how it is processed and used. Subject is oriented to programming, application solutiosn ratgher than technical details.Therefore topics of MySQL, Oracle databases are included to address existing solutions for data distribution, distributed filesystems, P2P, RMI and other similar techynologies are analyzed. | |

| FMITB16811 | CORPORATE SYSTEMS ARCHITECTURE | 3 ECTS |
|---|---|---|
| **Lectures** – 6 hours/semester | **Practical works** – N/A | **Consultations** – 2 hours/semester |
| **Laboratory works** – 4 hours/semester | **Individual work** – 68 hours/semester | |
| **Course aim** | Familiarize students with the principles of implementing architectures of corporate systems. | |
| **Course description** | The definitions for software or information systems architecture share two points: high-level breakup of a system into components and the decisions that are difficult to change. There is no single way to describe an architecture, and the importance of various architecture aspects can change throughout the life-cycle of an information system. Corporate systems possess the following qualities: persistent large-scale data, the need to access data in parallel, multiple interfaces, problems for integrating separate systems, and complex business logic. | |

| FMITB20400 | DATABASE SYSTEMS | 6 ECTS |
|---|---|---|
| **Lectures** – 24 hours/semester | **Practical works** – N/A | **Consultations** – 4 hours/semester |
| **Laboratory works** – 24 hours/semester | **Individual work** – 108 hours/semester | |
| **Course aim** | To get acquainted with the main principles of database work using SQL. | |

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| **Course description** | The course is designed to acquaint students with the concepts of relational databases and relational database management systems, the principles of their work. Provides information on possible actions with database data using commands and operators. Normalization of databases to the third normal form is introduced. |

| FMITB21201 | OBJECT-ORIENTED PROGRAMMING (WITH COURSE WORK) | 6 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – N/A | **Consultations** – 4 hours/semester |
| **Laboratory works** – 30 hours/semester | **Individual work** – 96 hours/semester | |
| **Course aim** | To provide every major C++ language feature and the standard library facilities, to get understanding of the ideas presented in related lectures behind the language facilities, leading to mastery. | |
| **Course description** | This module provides students with a comprehensive study of the C++ programming Language. The course stresses the object paradigm including classes, inheritance, virtual functions, and templates. Beside the base C++ studies, presented course extends C++ skills to include C++/CLI. ISO/ANSI C++ essentials are featured by .net examples. | |

| FMITB16429 | PROGRAMMING TECHNIQUES (WITH COURSE PROJECT) | 6 ECTS |
|---|---|---|
| **Lectures** – 24 hours/semester | **Practical works** – 12 hours/semester | **Consultations** – 4 hours/semester |
| **Laboratory works** – 24 hours/semester | **Individual work** – 96 hours/semester | |
| **Course aim** | To provide object oriented programming knowledge and skills to apply it in Java programming language. | |
| **Course description** | Object-oriented programming course based on the Java programming language. The course will cover principles of object oriented programming: classes, objects, encapsulation, inheritance, polymorphism, visibility of class elements. Memory management, exception management, standard Java libraries, networked features of Java technology are introduced. The course provides examples on good programming practice and Java language usage for development of mobile applications (Android) and web systems (JEE). | |

| FMITB21610 | SOFTWARE TESTING | 6 ECTS |
|---|---|---|
| **Lectures** – 24 hours/semester | **Practical works** – N/A | **Consultations** – 4 hours/semester |
| **Laboratory works** – 24 hours/semester | **Individual work** – 108 hours/semester | |
| **Course aim** | Obtain basic software testing theoretical and practical knownledge. | |

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| **Course description** | Practical and theoretical knowledge about software testing is presented in this module. Testing methods and tools for funcional and nonfuncional testing are described. The tools and methods are used practically during lab works. Web application testing, web services testing are considered. Automation of testing is presented. Automated tests' generation and execution frameworks and tools are presented and used by the students during course. |

| FMITB18720 | WORKFLOW APPLICATIONS | 3 ECTS |
|---|---|---|
| **Lectures** – 12 hours/semester | **Practical works** – N/A | **Consultations** – 2 hours/semester |
| **Laboratory works** – 12 hours/semester | **Individual work** – 54 hours/semester | |
| **Course aim** | To provide knowledge about workflow in e-business. | |
| **Course description** | Workflow applications. Workflow for e-business. Workflow application design methods and technologies. | |

| FMMMB16202 | DISCRETE MATHEMATICS 2 | 6 ECTS |
|---|---|---|
| **Lectures** – 45 hours/semester | **Practical works** – 30 hours/semester | **Consultations** – 4 hours/semester |
| **Laboratory works** – N/A | **Individual work** – 81 hours/semester | |
| **Course aim** | To acquaint with basic concepts of graph and number theory, complexity of algorithms, informatikon theory. Students must be able solve typical problems, apply modern mathematical methods to solve real life problems. | |
| **Course description** | Graph theory. Elements of number theory. Complexity of algorithms. Elements of informatikon theory. | |

| FMMMB16201 | INTEGRAL CALCULUS | 6 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 30 hours/semester | **Consultations** – 4 hours/semester |
| **Laboratory works** – N/A | **Individual work** – 96 hours/semester | |
| **Course aim** | The aim of this course is to provide the knowledge from integral calculus, to achieve the ability to analyze situation, to choose the appropriate problem solving method, to present and clarify the obtained results, to develop the ability use the knowledge and practical abilities in the study process. | |

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| **Course description** | Integral calculus of functions of one variable: anti-derivatives, indefinite and definite integrals, the basic definitions, methods of integration, the properties of indefinite and definite integrals, Newton-Leibnitz formula, applications of definite integrals, multivariable functions, double and line integrals, ordinary differential equations and their solutions. |

| FMMMB16210 | INTEGRALS, DIFFERENTIAL EQUATIONS AND SERIES | 6 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 4 hours/semester |
| **Laboratory works** – 15 hours/semester | **Individual work** – 96 hours/semester | |
| **Course aim** | The aim of this course is to provide the knowledge from integral calculus, the theory of differential equations and series elements, to achieve the ability to analyze situation, to choose the appropriate problem solving method, to present and clarify the obtained results, to develop the ability use the knowledge and practical abilities in the study process. | |
| **Course description** | Integral calculus of functions of one variable: anti-derivatives, indefinite and definite integrals, the basic definitions, methods of integration, the properties of indefinite and definite integrals, Newton-Leibnitz formula, applications of definite integrals, multivariable functions, double and line integrals, ordinary differential equations and their solutions. | |

| FMMMB16211 | MATHEMATICS 2 | 6 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 4 hours/semester |
| **Laboratory works** – 15 hours/semester | **Individual work** – 96 hours/semester | |
| **Course aim** | The aim of this course is to provide the knowledge from integral calculus, the theory of differential equations and series elements, to achieve the ability to analyze situation, to choose the appropriate problem solving method, to present and clarify the obtained results, to develop the ability use the knowledge and practical abilities in the study process. | |
| **Course description** | Integral calculus of functions of one variable: anti-derivatives, indefinite and definite integrals, the basic definitions, methods of integration, the properties of indefinite and definite integrals, Newton-Leibnitz formula, applications of definite integrals, multivariable functions, double and line integrals, ordinary differential equations and their solutions. | |

| FMMMB16209 | PROBABILITY THEORY AND MATHEMATICAL STATISTICS | 6 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 30 hours/semester | **Consultations** – 4 hours/semester |
| **Laboratory works** – N/A | **Individual work** – 96 hours/semester | |
| **Course aim** | To introduce the methods of calculation of indefinite and definite integrals and their applications. Present classification of differential equations and their solutions, to introduce the numerical and functional series. | |
| **Course description** | Antiderivative. Definite integrals and their application. Functions of several variables. Partial derivatives. Extreme values. First order differential equations. Higher order differential equations. Higher order linear differential equations with constant coefficients. Number series. Power series and their application. | |

| FMSAB19369 | ECONOMETRICS | 6 ECTS |
|---|---|---|
| **Lectures** – 45 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 4 hours/semester |
| **Laboratory works** – N/A | **Individual work** – 96 hours/semester | |
| **Course aim** | The aim of this course is to introduce the main econometrics models and to consider their application in practice. | |
| **Course description** | The main conceptions in creating linear regression and time series statistical models are presented in this course. The questions of a model identification, fitting the models parameters, model diagnostic and forecasting are considered. Besides theoretical knowledge students have to solve tasks on the black board and using the special statistical program package for full statistical analysis. | |

| FMSAB19370 | ECONOMETRICS (COURSE WORK) | 3 ECTS |
|---|---|---|
| **Lectures** – N/A | **Practical works** – N/A | **Consultations** – N/A |
| **Laboratory works** – 30 hours/semester | **Individual work** – 50 hours/semester | |
| **Course aim** | The aim of this course is to introduce the main econometrics models and to consider their application in practice. | |
| **Course description** | The main conceptions in creating linear regression and time series statistical models are presented in this course. The questions of a model identification, fitting the models parameters, model diagnostic and forecasting are considered. Besides theoretical knowledge students have to solve tasks on the black board and using the special statistical program package for full statistical analysis. | |

| FMSAB19209 | INTEGRAL CALCULUS | 6 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 30 hours/semester | **Consultations** – 4 hours/semester |
| **Laboratory works** – N/A | **Individual work** – 96 hours/semester | |
| **Course aim** | The aim of the course is to introduce notions of indefinite, definite, improper, multiple integrals, to discuss applications of the integral, to present elements of differential equations and infinite series. | |
| **Course description** | In the course, the definition of indefinite integral, various integration techniques, definite integrals and their applications in geometry, mechanics and engineering are considered. Double and triple integrals, differential equations of the first and second orders and various applications are presented. Also, the course is designated for number and function series and their application in approximate calculation. | |

| FMSAB16202 | INTEGRAL CALCULUS | 6 ECTS |
|---|---|---|
| **Lectures** – 10 hours/semester | **Practical works** – 6 hours/semester | **Consultations** – 4 hours/semester |
| **Laboratory works** – 6 hours/semester | **Individual work** – 134 hours/semester | |
| **Course aim** | The aim of the course is to introduce notions of indefinite, definite, improper,,multiple integrals, to discuss aplications of the integral, to present elements of differential equations and infinite series. | |
| **Course description** | In the course variuos methods of integration and aplication of the integral calculus in geometry, mechanics, etc., are discussed. Multiple and line integral are evaluated using polar, cilindrical, spherical coordinates, their aplication are discussed. Differential equations of the first and higher orders as well as system of differential equations are solved. Infinite series are aplied for variuos approximations. | |

| FMSAB19206 | PROBABILITY THEORY AND MATHEMATICAL STATISTICS | 9 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 30 hours/semester | **Consultations** – 6 hours/semester |
| **Laboratory works** – 15 hours/semester | **Individual work** – 159 hours/semester | |
| **Course aim** | To provide students with an understanding of the probability theory, to develop their ability to solve problems of mathematicalstatistics and apply their knowledge for statistical data analysis. | |

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| **Course description** | The course is devoted to the basics of the probability theory and mathematical statistics. The definitions for random event andprobability are formulated, their main properties are presented. Random variables and their properties are studied, acquaintancewith some discrete and continuous random distributions is made further. The second part of the course consists of the mainprinciples of mathematical statistics. Methods for population parameter estimation and statistical hypothesis testing areoverviewed. Each topic is illustrated by applications and solutions of practical tasks. Computer software application in statistics isintroduced for students. |

| FMFIB16214 | APPLIED PHYSICS | 6 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 4 hours/semester |
| **Laboratory works** – 15 hours/semester | **Individual work** – 96 hours/semester | |
| **Course aim** | To provide knowledge of the electrostatic, direct and alternating electrical current, magnetic field, electromagnetic oscillations and waves, wave and quantum optics, solid-state structure of the framework, atomic and nuclear physics. Contribute to the physical framework for studying specific subjects. | |
| **Course description** | Taught electrostatic field, electric current, magnetic field, electromagnetic oscillations and waves, wave and quantum optics, solid state band theory, atomic and nuclear physics. Emphasis is placed on all sections of the spectrum of electromagnetic waves on human body, the thermal radiation patterns, thermal pollution, the application of laser science and technology, nuclear physics and radiation issues. | |

| FMFIB19223 | APPLIED PHYSICS | 3 ECTS |
|---|---|---|
| **Lectures** – 6 hours/semester | **Practical works** – 6 hours/semester | **Consultations** – 2 hours/semester |
| **Laboratory works** – N/A | **Individual work** – 66 hours/semester | |
| **Course aim** | To give students the theoretical knowledge of modern physics and practical skills required in analysis and application of fundamental laws of nature. To describe the academic achievements of emerging technologies in the content, to teach how to evaluate the theoretical and experimental data and their reliability. | |
| **Course description** | Applied Physics module gives knowledge on electrostatic field effects, explains appearance and dynamics of electric conductivity of materials and electric current that generates a magnetic field. Electromagnetic induction in vehicles. It explains physical properties of Electromagnetic waves that propagate through various media, laws of optics and it engineering applications, solid body concept, modern concept of atomic nuclear and connection with transport engineering. | |

| FMFIB16220 | APPLIED PHYSICS | 3 ECTS |
|---|---|---|
| **Lectures** – 15 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 2 hours/semester |
| **Laboratory works** – 15 hours/semester | **Individual work** – 33 hours/semester | |
| **Course aim** | To give knowledge about materials in electrical and magnetic fields, electromagnetic waves, the spectrum of their appliance and the use in technique and technologies. To explain the nature of electromagnetic wave, to give modern view about the atom and nuclear physics, to characterize the content of created technologies achieved by physics science, to teach to estimate theoretical and experimental got data and their reliability, to prepare for the bioengineering studies. | |
| **Course description** | Materials in electric and magnetic fields. Electromagnetic oscillations and waves, their characteristics and laws. Photometry. Waves and quantum phenomena determined by electromagnetic radiation. Electrographic and neutronographic methods of the researches of materials and their application. Nuclear energy. | |

| FMFIB16216 | APPLIED PHYSICS | 3 ECTS |
|---|---|---|
| **Lectures** – 15 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 2 hours/semester |
| **Laboratory works** – N/A | **Individual work** – 48 hours/semester | |
| **Course aim** | To give knowledge on subject of the behavior of charge in electric and magnetic fields, electromagnetic waves, their energy spectrum and application. To explain the quantum nature of electromagnetic waves, to describe the academic achievements of emerging technologies in the content, to develop scientific thinking skills, To give knowledge on subject of the behavior of materials in electric and magnetic fields, electromagnetic waves, their energy spectrum and application. | |
| **Course description** | This module gives knowledge on electrostatic field effects, explains appearance and dynamics of electric conductivity, voltage, potential and electromotive force. Explained how electric current generates a magnetic field. It explains physical properties of electromagnetic waves, main laws of optics and it applications, the structure of atoms, crystalline structure of solids. It discusses a nature of atom's nucleus and gives most modern ideas regarding composition of nucleons and describes a state of electrons in a crystal by means of theory of energy bands and principles of semiconductor devices operation. | |

| FMFIB19214 | ENVIRONMENTAL PHYSICS | 6 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 4 hours/semester |
| **Laboratory works** – 15 hours/semester | **Individual work** – 96 hours/semester | |
| **Course aim** | To give the theoretical knowledge in environmental physics and form the practical skills in application of fundamental laws ofnature. To contribute to the physical framework for studying specific subjects. | |
| **Course description** | The subject provides students with the knowledge of electrostatic phenomena in the atmosphere, laws of light propagation in theatmosphere, heat pollution, ionizing and non-ionizing electromagnetic radiation in the environment, sound characteristics andacoustic pollution, kinetic and thermal properties of liquids, hydrodynamic processes in oceans, seas and rivers, earth's physicalcharacteristics, earth's magnetic field, dynamics of earth's crust, sources of renewable and non-renewable energy and energyconversion physics in them. The most important physical processes occurring in the atmosphere, hydrosphere and lithosphereare emphasized by taking into consideration the special subjects taught in the Faculty of Environmental Engineering. | |

| FMFIB16229 | PHYSICS 2 | 3 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – N/A | **Consultations** – 2 hours/semester |
| **Laboratory works** – 15 hours/semester | **Individual work** – 33 hours/semester | |
| **Course aim** | To give students the theoretical knowledge and problem-solving skills required in analysis and application of fundamental laws of nature. | |
| **Course description** | Electrostatics. Electrical properties of substances, theory of their conductivity. Magnetic field in vacuum and material. Maxwell'sequations for electromagnetic field. Wave optics. Light interaction with materials. Quantum mechanics. Laser. Biological effects ofradioactive radiation. | |

| FMISM20201 | COMPUTER NETWORKS AND OPERATING SYSTEM SECURITY | 9 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 30 hours/semester | **Consultations** – N/A |
| **Laboratory works** – N/A | **Individual work** – 180 hours/semester | |
| **Course aim** | The module aims at providing students theoretical and practical knowledge on computer network and operating system secure exploitation and management. | |

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| **Course description** | Appropriate computer network and operating system exploitation is a part of company's information security policy that requires specific knowledge and practice. Efficiency of information security measures is directly proportional to understanding of information systems interconnections and their application as a complex of measures. The module reviews the main problem areas in computer network and operating system security and provides possible solution scenarios. |

| FMISM20202 | ETHICAL HACKING TECHNIQUES (WITH COURSE WORK) | 6 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – N/A | **Consultations** – N/A |
| **Laboratory works** – 15 hours/semester | **Individual work** – 115 hours/semester | |
| **Course aim** | To provide students with knowledge and skills necessary to evaluate information systems security from outside of the organization. | |
| **Course description** | Ethical hacking and vulnerability scanning technologies are evaluated as compulsory part of any organization's information system security evaluation. While studying this course students will get familiar with different vulnerability scanning technologies and learn how to act as an ethical hacker, detecting existing vulnerabilities in organization's IT infrastructure without harming its functioning. The possessed understanding of methods and techniques used by hackers will also help the security specialist to plan appropriate countermeasures and evaluate their effectiveness. | |

| FMISM18200 | MALWARE ANALYSIS METHODS | 6 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – N/A |
| **Laboratory works** – N/A | **Individual work** – 115 hours/semester | |
| **Course aim** | To get acquainted with malware functionality and how to detect it. | |
| **Course description** | Malware analysis is one of the most critical skills for people, planning security analyst career. During this course, students will get known with malware, methods how malware is analyzed, what tools are used. Students that choose this course will create their own malware analysis laboratories where brief or in-depth malware analysis can be performed on infected documents, executables, media files. This course covers parts of reverse engineering, disassembly, network traffic analysis and other methods. Course is recommended for students, interested in incidence responses, work with malware and understanding how it acts and what methods exist to analyze and stop it. | |

| FMISM17202 | VIRTUAL INFRASTRUCTURE AND CLOUD COMPUTING SECURITY | 6 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – N/A |
| **Laboratory works** – N/A | **Individual work** – 115 hours/semester | |
| **Course aim** | Provide knowledge on virtualization technologies, virtual infrastructure and clouds, to develop ability to evaluate threats and vulnerabilities in virtuali infrastructure and clouds and to make decisions on security management in virtuali infrastructure and clouds. | |
| **Course description** | The course provides knowledge of virtualization technologies, Linux containers, virtual infrastructure architecture, virtual repositories, clouds, and relevant security solutions used in these IT technologies. It teaches to evaluate security threats and vulnerabilities in virtual infrastructure and cloud computing and to make decisions that mitigate security risk in virtual infrastructure. Subject deals with security threats of hypervisor, virtual network, repositories, covers security aspects of virtual desktop infrastructure, virtual infrastructure maintenance and operational activities are analyzed. Security of cloud models and methods is reviewed, also data privacy, identity, contract management aspects in the clouds are anlyzed, cloud security standards are reviewed. | |

## MECHANICS FACULTY

| MEMKB17236 | BACHELOR GRADUATION THESIS 2 | 6 ECTS |
|---|---|---|
| **Lectures** – N/A | **Practical works** – 12 hours/semester | **Consultations** – 2 hours/semester |
| **Laboratory works** – N/A | **Individual work** – 146 hours/semester | |
| **Course aim** | To learn to write the Project theoretical part, to make technical calculations, to draw correctly drawings, present and define them. | |
| **Course description** | According to the work task are developed the schemes of construction of mechanisms and devices, are calculated construction, kinematical and other parameters are creating the control schemes and algorithms. On the basis of loading are calculated the main construction sizes of the parts. The common wiews, assembly drawings and diagrams are creating of devices and their parts. | |

| MEMKB17237 | BACHELOR GRADUATION THESIS 3 | 9 ECTS |
|---|---|---|
| **Preparation for evaluation** – 10 hours/semester | **Final thesis -** 230 hours/semester | |
| **Course aim** | To learn to write the Project theoretical part, to make technical calculations, to draw correctly drawings, present and define them. | |
| **Course description** | Calculation correction, selection of the schemes and the workflow. In design final works are made 4 of A1 size drawings - general view, assembly drawings of separate mechanisms and drawings of parts. In technological final works are made 4 of A1 size schemes of the technological processes and economical evaluation. | |

| MEMKB17166 | DESIGN OF MACHINES AND INSTRUMENTS 1 | 3 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – N/A | **Consultations** – 2 hours/semester |
| **Laboratory works** – 15 hours/semester | **Individual work** – 33 hours/semester | |
| **Course aim** | To get acquainted with methods of the design of machines and instruments, allowing to get required force and speed characteristics of the machine, with designing of precise mechanisms, mechanism of summing of motions, traction mechanisms, particularities of mechanisms of instruments. Develop skills to apply this knowledge to the selection of main machine and instrument components and assemblies. | |
| **Course description** | Machine design process. Selection of motors. Methods of design of drives. Design of gear boxes. Design of spindles, using various bearings: sliding bearings (hydrodynamic type, hydrostatic type), rolling bearings. Design of summing of motions mechanisms, traction mechanisms. Particularities of design of instruments. | |

| MEMKB17168 | ECOLOGICAL DESIGN | 6 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 4 hours/semester |
| **Laboratory works** – 15 hours/semester | **Individual work** – 96 hours/semester | |
| **Course aim** | Learn the rational use of material and energy resources in the design of new products that their operation would have the lowest impact on the environment, using the minimum amount of energy. To get knowledge about automation of technical systems and processes, to learn to analyze, to choose and to design the means of automation. | |

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| **Course description** | The material properties of ecological assessment. Clean production process for the design of new facilities. Material and energy cost reduction in the production process. Device design optimization, reducing their performance and recovery costs. Understanding of the technical system, and the human role in it. Understanding about technical system and human role in it. Social result of automation. Automation influence to technologic processes. Peculiarities of design of technologic processes. Robots and their role in manufacturing. Automation of technologic processes. |

| MEMKB17239 | EQUIPMENT ASSEMBLY TECHNOLOGIES | 3 ECTS |
|---|---|---|
| **Lectures** – 24 hours/semester | **Practical works** – 12 hours/semester | **Consultations** – 2 hours/semester |
| **Laboratory works** – N/A | **Individual work** – 42 hours/semester | |
| **Course aim** | To provide knowledge of various equipment assembling technologies as well as devices and means usable. | |
| **Course description** | Fundamental of accuracy achievement in assembly. Methods of assembly organization. Technological preparation. Division of an equipment into units, junctions, subjunctions. Assembly and control of typical connections and junctions. Mechanisation and automatization of assembly works. Comparison of ekonomical efficiency of clifferent processes of assembly. | |

| MEMKB17255 | FUNDAMENTALS OF INNOVATION MANAGEMENT | 3 ECTS |
|---|---|---|
| **Lectures** – 24 hours/semester | **Practical works** – 12 hours/semester | **Consultations** – 2 hours/semester |
| **Laboratory works** – N/A | **Individual work** – 42 hours/semester | |
| **Course aim** | The course aims to provide students with the knowledge and skills necessary for innovation development. | |
| **Course description** | This module presents key concepts and principles of innovation and innovation management process, innovation clasification, creativity stimulation tools and methods, ideas generation and evaluation process, management of innovation develoment team, development of innovation project, sources of innovation financing, innovation comercialisation process, intelectual property rights, licencing. | |

| MEMKB17379 | MATERIALS SCIENCE 1 | 3 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – N/A | **Consultations** – 2 hours/semester |
| **Laboratory works** – 15 hours/semester | **Individual work** – 33 hours/semester | |

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| **Course aim** | To provide knowledge about materials used in the mechanical and production engineering, their properties, processing and application. |
| **Course description** | The basis of structural materials and treatment processes is presented in the module. Tasks and development of materials science. Mechanical and physical tests of materials properties. Metal production and casting. Forming by extrusion and cutting technologies of materials. Materials joining process and coating technologies. Polymeric, composite and ceramic materials and their technologies. Powder and additive manufacturing technologies. Non-destructive control of materials. |

| MEMKB17151 | MECHANICAL, LASER AND ANOTHER MANUFACTURING TECHNOLOGIES | 3 ECTS |
|---|---|---|
| **Lectures** – 15 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 2 hours/semester |
| **Laboratory works** – 15 hours/semester | **Individual work** – 33 hours/semester | |
| **Course aim** | To acquire knowledge about traditional mechanical and non-traditional and innovative materials processing technologies. Form the ability to correctly select materials and production technologies, to get to know some of the processing operations in practice. | |
| **Course description** | Materials processing technologies: cutting (turning, milling, drilling, deepening, expansion, threading, scraping, abrasive processing, etc.), deformation processing (stamping, rolling, pressing, etc.), casting technologies; processing of concentrated energy - laser cutting, drilling, welding, hardening, electron beam processing, magnetic and electromagnetic fields technologies; processing of water and abrasive jet, magnetically abrasive treatment, ultrassonic technologies, electroerosol treatment; electroplating, electro-hydraulic impact and other technologies. | |

| MEMKB18605 | NUMERICAL DESIGN OF MANUFACTURING TECHNOLOGIES | 6 ECTS |
|---|---|---|
| **Lectures** – N/A | **Practical works** – N/A | **Consultations** – N/A |
| **Laboratory works** – N/A | **Individual work** – N/A | |
| **Course aim** | N/A – will be updated. | |
| **Course description** | N/A – will be updated. | |

| MEMKB17165 | PRODUCTION TECHNOLOGY OF MACHINES AND INSTRUMENTS | 3 ECTS |
|---|---|---|
| **Lectures** – 15 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 2 hours/semester |
| **Laboratory works** – 15 hours/semester | **Individual work** – 33 hours/semester | |
| **Course aim** | To prepare the specialist which according to drawings of machine parts and their specifications would rightly understandprocesses of their production and itself could create, select, and improve technological processes of their production thanks towhich quality of a machine and its parts would be achieved with a minimal cost. | |
| **Course description** | Production and technological processes, operations, their division to separate parts. Machine as production object. Specificationsof a machine and its parts, their research, methods of quality assurance. Design and rating of technological process of partsproduction. Technological processes for production of machine parts of different types. Documentation of technologicalprocesses. | |

| MEMKB17167 | QUALITY MANAGEMENT | 3 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 2 hours/semester |
| **Laboratory works** – N/A | **Individual work** – 33 hours/semester | |
| **Course aim** | To give knowledge about terms of quality and indexes, systems, control of quality, administration of quality and quality of marketing. To determine what is dependence between quality of product and price. | |
| **Course description** | Conception of quality, prime rates of quality. Terms and descriptions. System of quality and its structure. Requirements and principles of quality system. Control of quality, administration of quality. Methods of quality control. Planning and organization of quality control. Methods of productions presentation for control. Internal audit of quality, its organization and planning. Methodology of quality audit. Concepts and terms of marketing. Requirements of quality for marketing. Quality of marketing. Price of quality and its optimization. | |

| MEMKB17156 | THEORY AND PRACTICE OF MEASUREMENTS (WITH COURSE PROJECT) | 6 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 4 hours/semester |
| **Laboratory works** – 15 hours/semester | **Individual work** – 96 hours/semester | |
| **Course aim** | To get acquainted with the theory and practice of measurements. General knowledge of the technologies required in mechanical engineering. knowledge of the laws of engineering mechanics, the principles of applied mechanics, designing of mechanisms, appliances, devices and apparatus, mathematical methods and laws applicable for description, analysis and designing of the objects of production in mechanical engineering. | |

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| **Course description** | Rudiment of metrology and measurement theory. The principles of statistical measurement theory. Transformation of measurement signals. Measuring instruments and methods. Measurement of process parameters. |

| MEMKB17238 | TRIBOLOGY | 3 ECTS |
|---|---|---|
| **Lectures** – 24 hours/semester | **Practical works** – 12 hours/semester | **Consultations** – 2 hours/semester |
| **Laboratory works** – N/A | **Individual work** – 42 hours/semester | |
| **Course aim** | To familiarize with mechanisms of friction and wear processes that proceeds in the components of machines. | |
| **Course description** | General conceptions. Principles of tribology. Friction. Wear. Lubrication. | |

| MERSB17122 | BACHELOR GRADUATION THESIS 2 | 6 ECTS |
|---|---|---|
| **Lectures** – N/A | **Practical works** – N/A | **Consultations** – N/A |
| **Laboratory works** – N/A | **Individual work** – N/A | |
| **Course aim** | To learn to write the Project theoretical part, to make technical calculations, to draw correctly drawings, present and define them. | |
| **Course description** | According to the work task are developed the schemes of construction of mechanisms and devices, are calculated construction, kinematical and other parameters are creating the control schemes and algorithms. On the basis of loading are calculated the main construction sizes of the parts. The common wiews, assembly drawings and diagrams are creating of devices and their parts. | |

| MERSB17123 | BACHELOR GRADUATION THESIS 3 | 9 ECTS |
|---|---|---|
| **Lectures** – N/A | **Practical works** – N/A | **Consultations** – N/A |
| **Laboratory works** – N/A | **Individual work** – N/A | |
| **Course aim** | To learn to write the Project theoretical part, to make technical calculations, to draw correctly drawings, present and define them. | |
| **Course description** | Calculation correction, selection of the schemes and the workflow. In design final works are made 4 of A1 size drawings - general view, assembly drawings of separate mechanisms and drawings of parts. In technological final works are made 4 of A1 size schemes of the technological processes and economical evaluation. | |

| MERSB17112 | CAD/CAM/CAE | 6 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 30 hours/semester | **Consultations** – 4 hours/semester |
| **Laboratory works** – N/A | **Individual work** – 96 hours/semester | |
| **Course aim** | Implementation of modern 3D systems for geometric form generation, construction parameters analysis and preparation of computer aided manufacturing. | |
| **Course description** | Overview of computer aided design and manufacturing. Computer aided design (CAD) and computer aided manufacturing (CAM) components, hardware and software. Concept of CAD: three-dimensional (3D) modeling, virtual modeling, integrated quality control. Interface between CAM and CAD. Fundamentals of CAM. Computer aided engineering. | |

| MERSB17107 | COGNITIVE PRACTICE | 3 ECTS |
|---|---|---|
| **Lectures** – N/A | **Practical works** – 15 hours/semester | **Consultations** – 2 hours/semester |
| **Laboratory works** – N/A | **Individual work** – 63 hours/semester | |
| **Course aim** | To familiarize with structure of factories, technological processes, mechanism, producible production. | |
| **Course description** | Characteristics of the company: history, management structure, activities and production results. The technological processes are applied to the company, production equipment and materials. Quality control. Work safety. | |

| MERSB17120 | DESIGN OF MECHATRONIC AND ROBOTIC SYSTEMS (WITH COURSE PROJECT) | 6 ECTS |
|---|---|---|
| **Lectures** – 24 hours/semester | **Practical works** – 24 hours/semester | **Consultations** – 4 hours/semester |
| **Laboratory works** – N/A | **Individual work** – 108 hours/semester | |
| **Course aim** | Introducing students with design process of mechatronic and robotic systems : methods of design of frames, drives, power elements and sensors. | |
| **Course description** | There is an intention to introduce general methods of design of machines and equipment. To introduce with design of mechatronic systems, selection of components, design of control systems. Overview of program driven system types, and their design, balance between software emulated and hardware released elements in mechatronic systems. Modernization of old mechanical equipment by implementing modern control systems. Choose of rational depth of modernization. | |

| MERSB17109 | ELEMENTS OF MECHATRONICS | 3 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – N/A | **Consultations** – 2 hours/semester |
| **Laboratory works** – 15 hours/semester | **Individual work** – 33 hours/semester | |
| **Course aim** | Introducing students with elements of mechatronic systems and their interaction. Joint of components of different physical nature to united mechatronic systems. | |
| **Course description** | Overview of elements of mechatronic systems, main their types. Properties of elements of mechatronic systems having different physical nature. Drives ant their systems, power elements. Sensors - from physical properties to data. Mechanical and structural elements. Definition of parameters of elements using theoretical and experimental methods. | |

| MERSB17401 | MACHINE ELEMENTS (WITH COURSE PROJECT) | 6 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 30 hours/semester | **Consultations** – 4 hours/semester |
| **Laboratory works** – 15 hours/semester | **Individual work** – 81 hours/semester | |
| **Course aim** | Introduction to machine elements and various joints of them. | |
| **Course description** | Machine elements. The criteria of operation. Joints of elements. Welded, pressed, riveted, glued joints. Thread, wedgeshaped, splined, pin joints (connections). Friction drives. Belt drives. Gear drives: cylindrical and conical gear drives. Worm gear drives. Shafts, bearings, couplings, sealing and lubricating equipment. Laboratory works. The course project. | |

| MERSB17113 | MECHATRONIC SYSTEMS 2 | 6 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 30 hours/semester | **Consultations** – 4 hours/semester |
| **Laboratory works** – N/A | **Individual work** – 96 hours/semester | |
| **Course aim** | Introducing students with control of mechatronic systems. Control of discreet, continuous and proportional systems. | |
| **Course description** | Overview of mechatronic systems control, types of controllers. Different types of mechatronic systems. Synthesis of desired properties in mechatronic system design. Parameters of control of different types of mechatronic systems, dynamics of mechatronic system control. Design of real systems using digital modeling without solving differential equations analytically. | |

| MERSB17121 | QUALITY AND CERTIFICATION IN THE AUTOMATED INDUSTRY | 6 ECTS |
|---|---|---|
| **Lectures** – 24 hours/semester | **Practical works** – 12 hours/semester | **Consultations** – 4 hours/semester |
| **Laboratory works** – 12 hours/semester | **Individual work** – 108 hours/semester | |
| **Course aim** | To get acquainted with the system of quality management and automated production conditions. | |
| **Course description** | The module introduces the concept of quality, the quality assurance system and its components and the functioning of the quality management process. | |

| MERSB17114 | ROBOTICAL TECHNOLOGY | 6 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 4 hours/semester |
| **Laboratory works** – 15 hours/semester | **Individual work** – 96 hours/semester | |
| **Course aim** | To familiarize students with the practical application of industrial robots, typical robotic solutions and the latest software packages used for these purposes. | |
| **Course description** | Introduction. Main tasks. Practical and economic aspects. Areas of application. Micro robotics. Nano systems. Widely used robotic systems and specific of application. Optical recognition tasks and applications. Methods of robotic systems integration. Programming of industrial robots. Languages and systems. Levels of robot programming. Problems related with robot programming. Recommended solutions. Off-line industrial robotic programming systems. Technical requirements for CAD/CAM models. Practical aspects of TCP control scenario. Tool control task. Commonly used robotic systems. Technical and practical aspects robotic systems. Commonly used robotic system control software. Recommendations for practical applications. | |

| MEBIM17067 | BIOFLUID MECHANICS | 6 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – N/A |
| **Laboratory works** – N/A | **Individual work** – 115 hours/semester | |
| **Course aim** | To introduce the concepts of biofluids, their properties and differences from other fluids. | |
| **Course description** | The course is dedicated to familiarizing with the features of biofluids, investigating their differences from other fluids, and analyzing biofluid statics and dynamics. During this course, the blood flow is analyzed and modeled. A great attention is paid to the phenomena of the blood flow in the pathological blood vessels. | |

| MEBIM17066 | BIOSIGNALS ANALYSIS AND RECOGNITION | 9 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – N/A |
| **Laboratory works** – 15 hours/semester | **Individual work** – 180 hours/semester | |
| **Course aim** | Introduce students to features, measuring and processing methods of biosignals, their analysis and application in practice. | |
| **Course description** | Biosignal concept, origin, relation to biological system. Classification of biosignals and their characteristics. Biosignal measuring tools and processing methods. Biosignal measurement methods: Electrocardiography, Electromyography, Electroencephalography, Electroelectrolysis, Electroethanography, Magnetocardiography, Magnetonephalography and others. Noise reduction ways in medicine. The latest research in the field of biosignal analysis. | |

| MEBIM17069 | INFORMATION SYSTEMS IN MEDICINE | 6 ECTS |
|---|---|---|
| **Lectures** – 15 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 15 hours/semester |
| **Laboratory works** – N/A | **Individual work** – 115 hours/semester | |
| **Course aim** | Introduce to hospital information systems, their function and state, algorithms of medical diagnostics and software. | |
| **Course description** | Hospital information systems, their functions. Computer networks in health-care institutions. Health care information infrastracture standards. Electronic health fundamentals. Electronic patient records. Clinical data, information types, modern technologies. Patient databases, data acquisition. Medical reasoning and medical knowledge. Statistic decision theory and signal processing in medical diagnostics. Artificial neural networks - characteristics, methods, algorithms and applications. Clinical decision support systems, types, application areas. | |

| MEBIM17070 | METHODS OF BIOTECHNICAL SYSTEMS AND MEDICAL DIAGNOSTIC | 6 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – N/A | **Consultations** – 15 hours/semester |
| **Laboratory works** – N/A | **Individual work** – 115 hours/semester | |
| **Course aim** | Provided knowledge about the failure search methods, statistical method in diagnostics, diagnostics information's collections methods, medical diagnostics features. | |

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| **Course description** | Diagnostic models: functional model, structural model. Diagnostics of medical devices. Statistics methods of diagnostics theory: Baes' method, statistical decision methods. diagnostics information's collections methods, medical diagnostics methods. |

| MEMKM17350 | DESIGN OF MECHANICAL SYSTEMS (WITH COURSE PROJECT) | 12 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 30 hours/semester | **Consultations** – 15 hours/semester |
| **Laboratory works** – N/A | **Individual work** – 245 hours/semester | |
| **Course aim** | To get acquainted with the structure of mechanical systems, their constituent parts, methods of estimation of the mechanical part of system during the analysis of mechanical system operation. To get acquainted with simulation of mechanical systems.To get acquainted with the structure, principles of their creation, calculations, which are peformed during the designing, sensors used in systems, actuators, control systems. To present information. | |
| **Course description** | Mechanical elements, structure, principles of design, components of mechanical systems. Constituent parts of manipulators, their structure and composition principles. Determination of positioning accuracy. Direct and inverse kinematic problems of manipulators, the velocity problem, problems of static forces, dynamic problems. The mechanical systems, their execution systems and their strength calculations. Grippers and principles of their calculations. Sensors, control systems. | |

| MEMKM17351 | ENGINEERING ECOLOGY | 3 ECTS |
|---|---|---|
| **Lectures** – 15 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – N/A |
| **Laboratory works** – N/A | **Individual work** – 50 hours/semester | |
| **Course aim** | Introduction to natural and anthropogenic ecological systems, their properties and the peculiarities of their interrelations. Learning to assess individually the efficiency of environmental protection measures and to settle technical problems upon the minimum environmental impact. | |
| **Course description** | Theoretical basics of engineering ecology. The conception of ecosystems and their interrelations. Energy in ecosystems and laws of ecosystems. Links and contrapositions of population ecology and engineering ecology. The criteria of ecological safety. Ecological expert's examination of projects. Methodology of assessing the environmental impact of anthropogenic activities. | |

| MEMKM20203 | EXPERIMENTAL MECHANICS | 6 ECTS |
|---|---|---|
| **Lectures** – 15 hours/semester | **Practical works** – N/A | **Consultations** – 15 hours/semester |
| **Laboratory works** – 15 hours/semester | **Individual work** – 115 hours/semester | |
| **Course aim** | To acknowledge with new methods and means of research of mechanical systems. | |
| **Course description** | Tasks of experimental mechanics. Methods of measurements and analysis of different mechanical. Tensometry. Polarisation - optical method of stress research. Aplication of holography. Method of Muar strokes. Thermal elasticity. Methods of nondestructive check, experimental analysis of vibrations. | |

| MEMKM18201 | INDUSTRIAL ORGANISATION AND STRATEGIC MANAGEMENT | 6 ECTS |
|---|---|---|
| **Lectures** – 23 hours/semester | **Practical works** – 22 hours/semester | **Consultations** – N/A |
| **Laboratory works** – N/A | **Individual work** – 115 hours/semester | |
| **Course aim** | To provide theoretical and practical knowledge in the field of industrial business organization and strategic management. | |
| **Course description** | Theoretical part of the study course provides basics of microeconomics, overview of market power and dominant companies, static and dynamic games, Cournot' and Bertrand' oligopolies introduces panel modeling using the Eviews program, introduces collusive strategies and dynamic models of oligopoly, product differentiation and price discrimination strategies, Stackelberg' oligopoly, Dixit' model, peculiarities of strategic analysis of entry barriers, Fudenberg & Tirole framework, entry deterrence and accommodation strategies, quality and reputation strategies, Signal theory, advertising, R&D, exclusive, predatory and M&A strategies. In the practical part, the knowledge provided in the theoretical part is consolidated on the basis of team work. | |

| MEMKM17357 | INNOVATION STRATEGY AND TACTICS | 6 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – N/A |
| **Laboratory works** – N/A | **Individual work** – 115 hours/semester | |
| **Course aim** | The course aims to provide students with the knowledge and skills necessary for innovation development. To learn patterns and peculiarities of innovation management, to be able to analyze innovation processes, and to be able to develop organization's innovation strategy and perform tactical solutions. | |
| **Course description** | The students, at the end of the course, will get knowledges on innovation development and its impact on society and economic growth, They will understand innovation in context of digital economy development, relationships between innovation and R&D. dynamics of understanding of innovation. The students will also learn linear model and nonlinear innovation development models such as Stage-gate, Toyota/Oobeya, Design thinking, System | |

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| | innovation, technological products develop methods and develop skills how to use them for innovation development. The module presents innovation development strategies, concept of open innovation, creativity flow theory for innovation development, ideas generation and evaluation methods, the Progress principle. The students will learn how to develop product innovations, to prepare innovation projects and to create prototypes. |

| MEMKM17358 | MANUFACTURING SIMULATION AND INDUSTRIAL PRODUCTION SYSTEMS | 6 ECTS |
|---|---|---|
| **Lectures** – 15 hours/semester | **Practical works** – 30 hours/semester | **Consultations** – N/A |
| **Laboratory works** – N/A | **Individual work** – 115 hours/semester | |
| **Course aim** | To acknowledge with principles of process, especially random, simulation and with manual and computer simulation, andsimulation programs. Acknowledge with different manufacturing processes simulation, their features and optimization.Introduce with objectives, tasks, designing of information systems of production management also with enterprise resourceplanning system. | |
| **Course description** | Simulation. Models of discrete and random processes, forming principles of random process models on the samples ofcomputer simulation by the use of ”Arena” program facilities. Comparing of model and system structure, analysis ofresults. Machining operations simulation, safeguarding of their productivity simulation and optimization. Procedures andbasic principles of work flow of manufacturing companies. General economic and manufacturing KPI’s. Compatibility ofinformation systems of production management with modern production strategies. Basic rules and planning oftechnological resources and human resources. Production management decisions’ economic evaluation and modeling.Integration of sales, supply chain and financial procedures into manufacturing. | |

| MEMKM17352 | MARKETING OF INNOVATIVE PRODUCTS AND INVESTMENT MANAGEMENT (WITH COURSE WORK) | 9 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 30 hours/semester | **Consultations** – N/A |
| **Laboratory works** – N/A | **Individual work** – 180 hours/semester | |
| **Course aim** | Provide knowledge and develop students’ skills in innovative product marketing and investment management. | |

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| Course description | Marketing of innovative product and investment management course covers marketing of innovative products and itsprocess, industrial activities and competitors, quantitative and qualitative demand analysis, innovative product marketingplanning, strategy and development, marketing strategic decisions and marketing mix of innovative product, industrial andconsumer markets similarities and differences, retailing and international marketing of innovative product, marketing ofinnovative product in internet; as well as investment management concept and investment planning, investment appraisalmethods, financial sources of investment and company's borrowing capacity assessment, investment climate. |

| MEMKM17360 | MASTER GRADUATION THESIS 2 | 3 ECTS |
|---|---|---|
| Lectures – N/A | Practical works – N/A | Consultations – N/A |
| Laboratory works – N/A | Individual work – N/A | |
| Course aim | N/A – will be updated. | |
| Course description | N/A – will be updated. | |

| MEMKM17374 | MASTER GRADUATION THESIS 4 | 30 ECTS |
|---|---|---|
| Lectures – N/A | Practical works – N/A | Consultations – N/A |
| Laboratory works – N/A | Individual work – N/A | |
| Course aim | N/A – will be updated. | |
| Course description | N/A – will be updated. | |

| MEMKM17375 | MASTER GRADUATION THESIS 4 | 30 ECTS |
|---|---|---|
| Lectures – N/A | Practical works – N/A | Consultations – N/A |
| Laboratory works – N/A | Individual work – N/A | |
| Course aim | N/A – will be updated. | |
| Course description | N/A – will be updated. | |

| MEMKM20201 | THEORY OF ENGINEERING EXPERIMENT (WITH COURSE WORK) | 6 ECTS |
|---|---|---|
| **Lectures** – 15 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 15 hours/semester |
| **Laboratory works** – N/A | **Individual work** – 115 hours/semester | |
| **Course aim** | To acknowlege with fundamentals of experiment planing, give knowledge about correlation of the real experiment and theoretical generalization and also about computerized data processing. To acquire the competence to compare theoretical and experimental results. | |
| **Course description** | Engineering experiment, errors and uncertainties of experiment, selection of variables, continuity of experiments and plan of experiment, statistical analysis of data, computer packages, control and analysis of experiment. | |

| MERSM17162 | CONTROL OF MECHATRONIC SYSTEMS | 6 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – N/A |
| **Laboratory works** – N/A | **Individual work** – 115 hours/semester | |
| **Course aim** | To give knowledge on mechatronical systems control theory, signals and control implementation using computer(controler) based data acquisition and control systems, to explain the methods of control systems analysis and synthesis,to give knowledge on adaptyve control systems and neural networks. | |
| **Course description** | Continous time and discrete time systems, control algorithms, direct and closed loop control, system analysis, Laplace,Fourier and ”z” transforms, signals, adaptyve control, neutral networks, computer based data acquisition and controldevices. | |

| MERSM17163 | DIAGNOSTICS IN MECHATRONICS | 6 ECTS |
|---|---|---|
| **Lectures** – N/A | **Practical works** – N/A | **Consultations** – N/A |
| **Laboratory works** – N/A | **Individual work** – N/A | |
| **Course aim** | To deliver knowledge about structure of mechatronic systems, to introduce with diagnostic equipment and their implementation methods of such systems. | |
| **Course description** | Provides information about the structure of mechatronics systems, methods of structure investigation and diagnostics of failures. Provides an overview of diagnostic equipment, introduces the circumstances of potential fault location of mechatronic systems. A description of the course of diagnostic testing of mechatronic systems is provided. | |

| MERSM17164 | MASTER GRADUATION THESIS 2 | 3 ECTS |
|---|---|---|
| **Lectures** – N/A | **Practical works** – N/A | **Consultations** – N/A |
| **Laboratory works** – N/A | **Individual work** – N/A | |
| **Course aim** | To develop experiment plan, to give competences to solve specialized mechanics and mechatronical systems problems, which are needed to perform scientific investigations, to obtain new knowledge and improve research methodics and to integrate knowledge from different fields. | |
| **Course description** | Further profounding in to problem under investigation, working out of experiment methodic, experimental equipment gathering, analysis of other similar work results and publications. | |

| MERSM17176 | MASTER GRADUATION THESIS 4 | 30 ECTS |
|---|---|---|
| **Lectures** – N/A | **Practical works** – N/A | **Consultations** – N/A |
| **Laboratory works** – N/A | **Individual work** – N/A | |
| **Course aim** | To develop wide erudition, ability to observe and critically analyze, investigate and creatively solve technical, administrative and juridical problems of design, manufacturing and maintenance questions for mechanics and mechatronical systems in global market conditions, understand influence and importance of made solutions in to society evolution, constantly improve professional skills when learning whole life. | |
| **Course description** | Information forthcoming from earlier modules last processing, application of suitable software, result presenting, conclusions and recommendations. Preparation of final work, report in conference, defense. | |

| MERSM17166 | MODELLING OF MECHATRONIC SYSTEMS | 9 ECTS |
|---|---|---|
| **Lectures** – 45 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – N/A |
| **Laboratory works** – N/A | **Individual work** – 180 hours/semester | |
| **Course aim** | Introducing students with various methods of mechatronic system modelling. | |
| **Course description** | Methods of modelling. Analysis of mechatronic systems on basis of their modelling possibility. Modelling of components of mechatronic systems. Jointed mechatronic systems, influence of control. Synthesizing of new mechatronic systems with desired properties in case of modelling new systems. | |

| MERSM17165 | SENSORS IN MECHATRONICS | 6 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – N/A |
| **Laboratory works** – N/A | **Individual work** – 115 hours/semester | |
| **Course aim** | To introduce with design features of sensors and their implementation in mechatronics. | |
| **Course description** | There are delivered detailed overview of sensors in mechatronics. Detailed description of their design features, methods and possibilities of their implementation in mechatronics. There are discussed possibilities of sensor design and enhancement. | |

## TRANSPORT ENGINEERING FACULTY

| TIAIB17076 | AUTOMOBILE TRANSPORT TRAFFIC SAFETY | 3 ECTS |
|---|---|---|
| **Lectures** – 24 hours/semester | **Practical works** – N/A | **Consultations** – 2 hours/semester |
| **Laboratory works** – 12 hours/semester | **Individual work** – 42 hours/semester | |
| **Course aim** | Provide students with the knowledge of road traffic safety, traffic safety system elements: car, driver and road environment, and the measures of accident rate reduction. | |
| **Course description** | Road safety policy making and regulating legislation. Road accident statistics and analysis. Traffic accident injury and causation. Part of road users in a context of road accidents. Active and passive safety of road car. Safety of road infrastructure. | |

| TIAIB17053 | AUTOMOTIVE THEORY | 6 ECTS |
|---|---|---|
| **Lectures** – 45 hours/semester | **Practical works** – N/A | **Consultations** – 4 hours/semester |
| **Laboratory works** – 15 hours/semester | **Individual work** – 96 hours/semester | |
| **Course aim** | To familiarize students with the forces operating in a moving car, the traction, braking, manageability, stability, uniformity of the movement, fuel economy and exploitation features. | |

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| **Course description** | The purpose of car theory. The forces acting on the car. Vehicle dynamics. Vehicle steerability. Vehicle stability. Vehicle cross-country ability. Vehicle exploitation economy. |

| TIAIB17054 | AUTOMOTIVE THEORY (COURSE WORK) | 3 ECTS |
|---|---|---|
| **Lectures** – N/A | **Practical works** – 30 hours/semester | **Consultations** – 2 hours/semester |
| **Laboratory works** – N/A | **Individual work** – 48 hours/semester | |
| **Course aim** | To learn to apply self-dependently the obtained theoretical knowledge, which is necessary in practical use for solution of the car theory problems, to be able to evaluate forces, acting the car in motion, to be able to calculate them and to analyse the created dependencies. | |
| **Course description** | Evaluation of forces acting on the car. Creation of the traction power dependence on car speed. Calculation of resistances to car motion. Calculation of the car dynamic factor and car acceleration. Creation of the power balance. Calculation of car stability. Creation of dependencies of the car braking distance and braking time on speed. Evaluation of efficiency of the car fuels. | |

| TIAIB17036 | STRUCTURAL AND EXPLOITATIONAL MATERIALS OF ROAD VEHICLES | 6 ECTS |
|---|---|---|
| **Lectures** – 45 hours/semester | **Practical works** – N/A | **Consultations** – 4 hours/semester |
| **Laboratory works** – 15 hours/semester | **Individual work** – 96 hours/semester | |
| **Course aim** | To provide knowledge for students about vehicle construction and operational use materials, classification, chemical composition, physical and chemical properties, operating conditions, work with their security features. | |
| **Course description** | Fuel, oil, gaseous fuels and their production. Their physical-chemical properties, the influence of vehicle reliability and longevity. Storage. Plastics, rubber, metals, wood, glue, glass. Their composition, types, production, physical-chemical properties application in transport. Technical fluids. | |

| TIAIB17058 | VEHICLES DESIGN | 6 ECTS |
|---|---|---|
| **Lectures** – 45 hours/semester | **Practical works** – N/A | **Consultations** – 4 hours/semester |
| **Laboratory works** – 15 hours/semester | **Individual work** – 96 hours/semester | |
| **Course aim** | Analysis of the main units of automobiles, their destination, classification, structure and working peculiarities. Develop skills to apply this knowledge to the selection of main car components and assemblies. Design and calculations of their main units and parts. | |

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| **Course description** | Available a historical overview of car components, its development, types currently in use, schemes, analysis of construction and operation. Further there are analysed their structure, interaction and operation, reviewed their characteristics and design. The presented material is aplenty illustrated with figures, diagrams and graphs. |

| TIMGB17119 | DESIGN FUNDAMENTALS | 3 ECTS |
|---|---|---|
| **Lectures** – 15 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 2 hours/semester |
| **Laboratory works** – 15 hours/semester | **Individual work** – 33 hours/semester | |
| **Course aim** | To acquaint the students with the main product design stages, general methods for designing and assessing products, the unified system of product construction documentation, standards and innovative activities. | |
| **Course description** | The information about the process of design, its stages and general methods of product design, construction and assessment as well as the unified system of product construction documentation is provided. General knowledge about standards, innovative activities and patents is given. Students are also acquainted with modular building and computer design of products. | |

| TIMGB17122 | DIAGNOSTIC METHODS OF THE TECHNOLOGICAL EQUIPMENT | 3 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – N/A | **Consultations** – 2 hours/semester |
| **Laboratory works** – 15 hours/semester | **Individual work** – 33 hours/semester | |
| **Course aim** | To acquaint students with modern diagnostic methods and diagnostic capabilities. Explain advantages and disadvantages of each method and using capability. Teach how to use modern diagnostic equipment. | |
| **Course description** | Non-destructive diagnostic methods for transport equipment. Diagnostics of the mechanical part for the internal combustion engines. Determination of the defects in the vehicle and transmission elements (shafts, gears, journal bearings, rolling bearings), diagnostic of pipeline transport (pumps, pipes, etc.). Methods for defect investigation in the construction of the equipment, diagnostics of the internal and external defects. Mathematical models for increasing equipment reliability. | |

| TIMGB17031 | TECHNOLOGIES OF VEHICLE PRODUCTION AND REPAIR | 3 ECTS |
|---|---|---|
| **Lectures** – 30 hours/semester | **Practical works** – 15 hours/semester | **Consultations** – 2 hours/semester |
| **Laboratory works** – N/A | **Individual work** – 33 hours/semester | |

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| **Course aim** | Consistent patterns of technological processes and basics of their formation. |
| **Course description** | Basics of technologies of vehicles production and repair. Typical and special technologies in production and repair of vehicles' parts. |