CEEPUS COURSES – FACULTY OF ENGINEERING 2023/2024

Course Code	Y-ERAS2001
Title:	**Food Preservation Techniques**
Teacher:	**Cecilia HODÚR, Zsuzsanna LÁSZLÓ**
Contact:	hodur@mk.u-szeged.hu zsizsu@sol.cc.u-sszeged.hu
Level	BSc (minimum 5 students)
Termin	spring semester (2 lessons a week) (mark: 1,3,5)
Module Aims	Aim of the course is to introduce most important parts of food preservation techniques.
Module Subject	Principles of food protection, protection of food by heating, evaporation, chilling, freezing, chemical preservation techniques, bio-preservation, new techniques used in food protection such as pulsed electric field, high pressure processing, x-rays, pulsed light, ozone, microwave, radio waves, and applications.
Number of Credits	4

Course Code	Y-ERAS1171
Title:	**Food Safety**
Teacher:	**Judit KRISCH**
Contact:	krisch@mk.u-szeged.hu
Level	BSc, MSc (minimum 5 students)
Termin	fall or spring semester (2 lessons a week) (mark: 1,3,5)
Module Aims	Aim of the course is to introduce basics of food safety.
Module Subject	Definitions: definition of food, food safety. Food safety in the EU: EC regulation 178/2002. Principles of the general food law. EFSA and RASFF. HACCP. Risk assessment, management and communication. Principles of HACCP. „From farm to fork" concept: Agriculture: food safety aspects of crop cultivation and husbandry. Food safety aspects of food processing. GMP, GHP, new technologies. Distribution of foods. Food retail. Food safety aspects for the catering industry and for home made foods. Hygiene: Cleaning and disinfection in the food industry. Hygiene at home.
Number of Credits	4

Course Code	Y-ERAS2021-00002
Title:	**Membrane separation techniques**
Teacher:	**Szabolcs KERTÉSZ**
Contact:	kertesz@mk.u-szeged.hu
Level	BSc (minimum 3 students)
Termin	spring semester (2 lessons a week) (mark: 1,2,3,4,5)
Module Aims	The aim of the course is to give general knowledge of the membrane technology, especially the pressure driven membrane separation processes like microfiltration (MF), ultrafiltration (UF) nanofiltration (NF) and reverse osmosis (RO).
Module Subject	The students will learn and understand some laboratory and industrial membrane separation methods and their basics. The utilizations of MF, UF, NF and RO processes, the membrane fouling and methods to reduce it by different techniques will be also discussed. Pre- and post-treatments will be analyzed for the process intensification. Other scope is to teach the application of membrane techniques in laboratory and industrial scale. Furthermore, the students will be able to understand and apply novel water purification membrane separation methods in wastewater treatment and water quality analysis. To learn and use the scientific literature article databases (like Scopus and Science direct) of the membrane separation techniques (related to water purification and food industry) is an important aim of the course.
Number of Credits	4

Course Code	Y-ERAS1061
Title:	**Meat and Meat Products Technology**
Teacher:	**Dóra BENCSIK**
Contact:	bencsikd@mk.u-szeged.hu
Level	BSc (minimum 5 students)
Termin	fall or spring semester (2 lessons a week) (mark: 1,3,5)
Module Aims	Aim of the course is to introduce most important parts of meat products technology.
Module Subject	Physical, chemical, microbiological and histological characteristics of meat, conversion of muscle to meat, preservation methods; meat refrigeration and freezing technologies, meat processing technologies; curing, smoking, emulsification, fermentation, canning, restructured meat products, meat packaging technology, quality control analysis in meat and meat products.
Number of Credits	4

Course Code	Y-ERAS1251
Title:	**Food Toxicology**
Teacher:	**Dóra BENCSIK**
Contact:	bencsikd@mk.u-szeged.hu
Level	BSc (minimum 5 students)
Termin	spring semester (2 lessons a week) (mark: 1,2,3,4,5)
Module Aims	The aim of the course is to provide students with the basis of food toxicology and their role in modern food science. Within the subject matter, the basic concepts of toxicology are discussed. Students can overcome the toxicological risks that arise when producing, processing and consuming food.
Module Subject	Principles of food toxicology, food additives, micotoxins, plant toxins, animal toxins, toxicological risks of food producing, processing and consumption, pesticide residues, veterinary products, plant protection products.
Number of Credits	4

Course Code	Y-ERAS1161
Title:	**Baking Technology**
Teacher:	**P. Balázs SZABÓ**
Contact:	szpb@mk.u-szeged.hu
Level	BSc (minimum 5 students)
Termin	fall semester (2 lessons a week) (mark: 1,3,5)
Module Aims	Aim of the course is to introduce most important parts of baking technology.
Module Subject	Physical and chemical properties of cereal, cereal quality criteria, storage of cereal, milling of cereal, flour quality criteria, rheology and chemistry of dough, bread making technology, macaroni production technology, biscuit production technology, bulgur production technology, breakfast cereals and snack food technology, quality control analyses in cereals and cereal productsWill be discussed the main raw materials of bread, particularly the flour, the yeast, the salt, and the water. Learn about the technology, scaling the ingredients, activates the yeast. Important part of the course is the mixing (mixing times, dough temperature, structure of the dough, dough kneading - kneader types, different methods - straight dough method; sponge and dough method - sourdough method -, sponge fermentation, sponge parameters, gluten development, and structure). We analyzed the baking process (heat transfer, steaming at the beginning of the baking process, temperature, baking time).
Number of Credits	4

Course Code	Y-ERAS1211 (lecture) ; Y-ERAS1214 (practice)
Title:	**Dairy Technology**
Teacher:	**József CSANÁDI**
Contact:	csanadi@mk.u-szeged.hu
Level	BSc (minimum 5 students)
Termin	fall semester (2+1 lessons a week) (mark: 1,2,3,4,5)
Module Aims	Aim of the course is to introduce the milk production, and the processing of raw milk.
Module Subject	Basic information of milk production, collection and reception. General treatments of milk processing (clarification, separation, fat standardization, homogenization and pasteurization). Production of market milk type milk product. Butter making. Production of fermented milk products. Cheese varieties, introduction to cheese making, the steps of the cheese making, the utilization of whey, the mechanization of cheese making. Production of milk powder and ice cream.
Number of Credits	4+2

Course Code	Y-ERAS1001
Title:	**Chocolate World**
Teacher:	**Ernő GYIMES**
Contact:	gyimes@mk.u-szeged.hu
Level	BSc (minimum 5, maximum 10 students)
Termin	fall semester (2 lessons a week) (mark: 1,3,5)
Module Aims	Aim of the course is to introduce most important parts of cocoa processing and chocolate manufacturing.
Module Subject	Discovering of cocoa and speading around the World. Introduction to cocoa tree, bean and the primary processing of cocoa. Different type of cocoa, flavour, taste. Chemical composition of cocoa bean. White, milk and plain chocolate: differences and similarities. Chocolate manufacturing and industrial processing. Cocoa butter and its alternatives. Moulding and enrobing of chocolate. Packaging of chocolate bar and pralines.
Number of Credits	4

Course Code	
Title:	**New Ways in Environmental Technology**
Teacher:	**Gábor VERÉB, Szabolcs KERTÉSZ, Sándor BESZÉDES**
Contact:	veregb@mk.u-szeged.hu; kertesz@mk.u-szeged.hu; beszedes@mk.u-szeged.hu
Level	BSc (minimum 5 students)
Termin	fall semester (2 lessons a week) (mark: 1,2,3,4,5)
Module Aims	The aim of the course is to give a general knowledge of environmental management and waste management in details. It is also important to investigate the possible solutions, the new methods and technologies, the technical background of modern environmental protection.
Module Subject	Different areas of environmental management, for example air and water quality management and air and soil protection. Concepts and application examples of circular economy, typical waste and by-products streams of some manufacturing technologies. Basics of waste (fluid, solid) treatments. Basics of handling and utilization of biowastes. Renewable energy sources. Direct and indirect energetic utilization of wastes. Waste-to-energy concepts: technologies, possibilities and drawbacks.
Number of Credits	4

Course Code	
Title:	**Environmental Economy**
Teacher:	**Szabolcs KERTÉSZ; Sándor BESZÉDES**
Contact:	kertesz@mk.u-szeged.hu beszedes@mk.u-szeged.hu
Level	BSc, MSc (minimum 5 students)
Termin	fall semester (1+1 lessons a week) (mark: 1,2,3,4, 5)
Module Aims	The aim of the course is to give general knowledge of natural resources, market failure of natural resources, environmental problems, environmental systems, technical description of environmental technologies and possible solutions, water and wastewater treatment processes, waste management, waste to energy concept, biomass utilization, renewable energy sources.
Module Subject	Overview of Environmental Problems and Economy. Basics of Environmental Management. Renewable Energy Sources. Waste and By-products Streams in Food Processing Technologies. By-product Utilization in Food Industry. Controlled biological treatments and processes for bio-waste handling and utilization. Overview of Waste to Energy (W2E) Concept. Environmental Pollutants (source, types). Basics of Wastewater Treatment Technologies. Novel Processes in Food Industry Wastewater Purification. Basics of Air Purification Methods.
Number of Credits	2

Course Code	
Title:	**Transport Phenomena in Food Industry I.**
Teacher:	**Szabolcs KERTÉSZ; Cecilia HODÚR, Sándor BESZÉDES**
Contact:	hodur@mk.u-szeged.hu; kertesz@mk.u-szeged.hu ; beszedes@mk.u-szeged.hu
Level	MSc, BSc
Termin	spring semester (2+2 lessons a week) (mark: 1,2,3,4,5)
Module Aims	The aim of course is to better understand of transport phenomena and give knowledge of the phenomenological and engineering principles of momentum- and heat transfer, that are the basis of the correct application of different food manufacturing processes, maintain the product quality and achieve enhanced energetic efficiency of the food processing technologies.
Module Subject	Food processing aspects of momentum transfer phenomena: momentum transfer variables, energy balances, laminar and turbulents flows, differential equations of momentum transfer. Fluid flow of Newtonian and non-Newtonian fluids. Basics of rheological behavior of foods and their raw materials. Thermal properties of foods. Governing equations for heat transfer by conduction, convection and radiation. Differential equations of heat transfer Modeling of heat transfer.
Number of Credits	4

Course Code	
Title:	**Transport Phenomena in Food Industry II.**
Teacher:	**Szabolcs KERTÉSZ; Cecilia HODÚR, Sandor BESZÉDES**
Contact:	hodur@mk.u-szeged.hu; kertesz@mk.u-szeged.hu ; beszedes@mk.u-szeged.hu
Level	MSc, BSc
Termin	fall semester (2+2 lessons a week) (mark: 1,2,3,4, 5)
Module Aims	The aim of course is to better understand of transport phenomena and give knowledge of the phenomenological and engineering principles of heat-, and mass transfer, that are the basis of the correct application of different food manufacturing processes, maintain the product quality and achieve enhanced energetic efficiency of the food processing technologies.
Module Subject	Differential equations of heat and mass transfer modeling. Mass transfer by diffusion: steady state and unsteady state molecular diffusion in gases, liquids and solids. Mass transfer by convection: film theory, two-film theory, mass transfer coefficient. Analogies for transport phenomena. Theory and applications of thermal and non-thermal concentration process for food industry. Modeling and minimization of fouling. Study of complex transport phenomena in food dehydration processes. Theoretical background of novel food manufacturing processes (osmotic dehydration, ohmic heating, microwave irradiation, membrane separation).
Number of Credits	4

Course Code	Y-ERAS1193
Title:	**Food Chemistry**
Teacher:	**Erzsébet ILLÉS**
Contact:	erzsebet.illes@mk.u-szeged.hu
Level	MSc (minimum 5 students)
Termin	fall semester (2 lessons a week) (mark: 1,2,3,4,5)
Module Aims	Aim of the course is to introduce the different disperse systems in food products and the functional properties of various food components.
Module Subject	Basic information on disperse systems and interfacial phenomena. Functional properties of major food components and additives (flavors, colorants). Discussion the colloid processes and the related technological challenges in fruit and vegetable juices, wines, food emulsions, dairy and bakery products. Nanotechnology in food industry.
Number of Credits	4

Course Code	
Title:	**Instrumental Analysis**
Teacher:	**Balázs JÓJÁRT; Lukács NÉMETH**
Contact:	jojartb@mk.u-szeged.hu; nemethl@mk.u-szeged.hu
Level	MSc (minimum 5 students)
Termin	fall (1 lesson a week) (mark: 1,2,3,4,5)
Module Aims	Introduction to the commonly used instrumental techniques used in food analysis.
Module Subject	General introduction into food analysis: evaluation, precision, calibration Methods of spectroscopy: general introduction, interaction of light with matter UV-VIS spectroscopy, calibration methods Atom spectroscopy, ICP Potentiometry Polarimetry Conductometry, Mass spectrometry, NMR
Number of Credits	4

Course Code	
Title:	**Dietetics**
Teacher:	**P. Balázs SZABÓ**
Contact:	szpb@mk.u-szeged.hu
Level	MSc, BSc (minimum 5 students)
Termin	fall semester (2 lessons a week) (mark: 1,3,5)
Module Aims	The goal is to learn the basics of nutrition.
Module Subject	Students will learn about the important micro and macro nutrients, their importance. In connection with this, they learn about the effects of deficiency or over intake and their prevention (and the possible treatment in a natural way). Energy and nutrient requirements. Physiological and biochemical processes in the body. Nutritional recommendations for a healthy adult population. Work-meal, water-physiological effect.
Number of Credits	2

Course Code	
Title:	**Food Branches Technology III.**
Teacher:	**P. Balázs SZABÓ**
Contact:	szpb@mk.u-szeged.hu
Level	MSc (minimum 5 students)
Termin	spring semester (2+3 lessons a week) (mark: 1,2,3,4,5)
Module Aims	The aim of this course is to learn different food technology
Module Subject	Beer technology, production of beer. Liquor technology, wine industry. Vegetable Oil Technology. Raw material. Sugar industry Canning and Refrigeration Technologies
Number of Credits	5

Course Code	
Title:	**Food Innovation**
Teacher:	**Ernő GYIMES**
Contact:	gyimes@mk.u-szeged.hu
Level	MSc. (minimum 5 students)
Termin	spring semester (2 lessons a week) (mark: 1,3,5)
Module Aims	
Module Subject	The course introduces the basics of food industry innovation. It reviews the concept and history of innovation. It introduces the most important innovation models (technology push, demand pull, backfeed, etc.). It describes the different sources of innovation and the measurement of innovation. It deals specifically with the characteristics of closed and open innovation and their comparison.
Number of Credits	4

Course Code	
Title:	**Pandemics and Food Safety**
Teacher:	**Diána BÁNÁTI**
Contact:	banati@mk.u-szeged.hu
Level	MSc (minimum 5 students)
Termin	spring or fall semester (2 lessons a week) (mark: 1,3,5)
Module Aims	Aim of the course is to get acquainted with the food safety aspects of pandemics, the role of food in the transmission of epidemic agents.
Module Subject	Students will learn about the major zoonotic diseases caused by viruses (including coronaviruses, such as SARS-CoV, MERS-CoV, SARS-CoV-2). They will learn about the diseases they cause in animals and humans (incl. the so-called avian flu, swine flu, with special respect to COVID-19). In addition to general human health information, major food safety aspects of pandemics will be discussed. Participants will learn about the possible role of foodstuffs and packaging in the spread of coronaviruses, and will analyse food safety risks arising at each part of the food chain, including production, processing and the HoReCa sector. The role of processing in the elimination of those viruses will be discussed in more detail. Special problems related to consumers and households will be discussed, too. Up-to-date information provided by the major human health and food safety authorities, such as WHO, ECDC, EFSA, US FDA, USDA, CDC, whether SARS-CoV-2 or any other emerging viruses could be transmitted via foods and packaging will be shared. Food safety recommendations of those organisations will be analysed, too.
Number of Credits	4

Course Code	Y-ERAS3091
Title:	**Kinematics and kinetics**
Teacher:	**István BÍRÓ**
Contact:	biro-i@mk.u-szeged.hu
Level	BSc (minimum 5 students)
Termin	spring semester (2 lessons a week) (mark: 1,3,5)
Module Aims	For students the main aims of the education of this module: Kinematic and kinetic investigation of moving mass points, rigid bodies and structures of rigid bodies including planar closed moving kinematical chains. Students will be able to compare the expected motion state with motion state realized by the investigated mechanism (moving structure).
Module Subject	Kinematics of mass point. Position, velocity, acceleration. Motion equations and diagrams. Kinematical investigation of translational motion of mass points. Harmonic oscillation. Circular motion. General plane and spatial motion. Kinematics of rigid bodies. The motion state of rigid body. Elemental motion components. Description of planar motion of rigid bodies. Velocity and acceleration state of planar moving rigid bodies. Kinematics of relative motion of mass points and rigid bodies. Degrees of freedom of mechanisms, constructions, classification. Kinematical investigations of planar four-bar moreover centric and eccentric slider crank mechanisms. Kinematical investigation of cam-drive mechanisms. Kinematical analysis of complex closed planar mechanisms containing more revolute and prismatic joints. Kinetics of mass points. Motion equations of mass points. Impulse, angular momentum, work, energy, power, efficiency. Constrained motion. Kinetics of relative motion. Vibration of mass points. Free vibration, damped free vibration, excited-damped vibration. Kinetics of particle systems. Collision of mass points and rigid bodies. Classification of different collisions. Elastic impact, inelastic collision, real collision. Kinetics of rigid bodies. Inertial moment of rigid bodies. The rotation of rigid bodies. Planar motion of rigid bodies. Rotational oscillating motion.
Number of Credits	4

Course Code	Y-ERAS3012
Title:	**Modelling and Programming in Measurement**
Teacher:	**János SIMON, József SÁROSI**
Contact:	simon@mk.u-szeged.hu
Level	BSc (minimum 5 students)
Termin	fall semester (0+2 lessons a week) (mark: 1,3,5)
Module Aims	Aim of the course is to introduce the modeling and programming in LabVIEW and Scilab environments with some practical aspects of measurement.
Module Subject	Introduction to measurement and data acquisition. Introduction to the LabVIEW Platform. Simple averaging and temperature conversion in LabVIEW. Acquisition and storage of measured data in LabVIEW without hardware. Configuring and testing DAQ devices. Acquire and output real-world signals, analyze data for meaningful information; develop embedded or autonomous systems; and share results using displays, reports. Acquisition and storage of measured data in LabVIEW with DAQ devices. Introduction to the Scilab. The Console & Editor. Matrices, functions & operators. Solving differential equations related to measurement in Scilab Xcos. Graphics & plotting.
Number of Credits	4

Course Code	
Title:	**Engine and Vehicle Systems**
Teacher:	**Ferenc FARKAS**
Contact:	farkasf@mk.u-szeged.hu
Level	BSc (minimum 5 students)
Termin	fall semester (2 lessons a week) (mark: 1,3,5)
Module Aims	For students the main goals of the education of this module: - to study different engine and vehicle systems - to be able to compare this systems - to know reasonable choosing the perfect solutions
Module Subject	Engine systems - Otto and Diesel engines - Four and two stroke cycle engines - Cycles of internal combustion engines - Losses, efficiencies and main characteristic curves - Process of mixture forming - Electronic injection systems - Supercharging of engines - Cooling and lubrication of engines Vehicle systems - Function of the power transmission systems - General construction of the master clutches, gear boxes, differential gears and the cardan drives - Carriage constructions and steering of vehicles - Brake systems of vehicles
Number of Credits	4

Course Code	
Title:	**Automobile Industry**
Teacher:	**Ferenc FARKAS**
Contact:	farkasf@mk.u-szeged.hu
Level	BSc (minimum 5 students)
Termin	fall or spring semester (2 lessons a week) (mark: 1,3,5)
Module Aims	Aim of the course is to introduce the automobile industry, management, design, safety, basic definitions and terminology. Some practical aspects are also part of the subject.
Module Subject	Introduction to the car: Factors involved in buying a car; Types of car; Car sales The exterior: Exterior car parts; Car production; A quality problem; 8D report The interior: Interior car parts; The instrument panel; A delivery problem; A car configuration Under the bonnet: The engine; A technical support hotline; An international car show Performance and technical specifications: Launching a new model; A road test; Materials and their properties; A meeting role-play Safety: A magazine article; Active and passive safety features; Choosing safety features; Car recalls Design: Describing car design; The design process; Constraints; Expanding the product range Future trends: The car of the future; Environmental awareness; Making a presentation; Fuel cells
Number of Credits	4

Course Code	
Title:	**Differential Equations**
Teacher:	**László CSIZMADIA**
Contact:	lcsizmadia@mk.u-szeged.hu
Level	BSC (at least 4th semester), MSC (1st semester)
Termin	spring (4 lessons a week: 2 lessons, 2 practices)
Module Aims	Introducing to basic concepts and basic proceedings of differential equations with loads of examples.
Module Subject	On the existence and uniqueness of solution of initial value problem; basic numeric methods (e.g. explicit, implicit Euler's method). Systems of ordinary differential equations. Mathematical model of some mechanical systems: models by the equation of mx"+kx'+hx=F (m, k, h>0, F: R->R, x=x(t): (a,b)->R). Basic concepts of Stability Theory of autonom systems: definitions by Ljapunov, phase space and stability property of the equilibrium. On the dynamical systems: maps, cobweb diagrams, properties of the fixed points, bifurcations.
Number of Credits	4

Course Code	Y-ERAS4241
Title:	**Data and information visualization**
Teacher:	**György HAMPEL**
Contact:	hampel@mk.u-szeged.hu
Level	BSc (minimum 5 students, maximum 20 students)
Termin	fall or spring semester (2 lessons a week) (mark: 1,3,5)
Module Aims	The aim of the course is to give an overview of human and computer aided information processing and visualization.
Module Subject	The human information processing. The types of data and information. Statistical data and information visualization using computer applications. The use of different chart types. Representation of relationships between data. Infographics.
Number of Credits	4

Course Code	Y-ERAS4191
Title:	**Organization and Logistics of Tourism**
Teacher:	**József GÁL**
Contact:	galj@mk.u-szeged.hu
Level	BSc (minimum 5 students)
Termin	fall or spring semester (2 lessons a week) (mark: 1,3,5)
Module Aims	Aim of the course is to introduce European tourism. We focus on Central and Eastern European part of the continent. To know some rules and financial aspects. Students plan a journey and make a tourist guide for travel agencies and a short film.
Module Subject	Europe and tourism, The history of tourism in Europe, The history of modern tourism in Europe, Tourist regions in Europe, The European Union, Tourism policy in the European Union, Regional policy and tourism in the European Union, Tourism and euro, Transportation in Europe and its impact on tourism, Environmental and social concerns in European tourism, Business tourism in Europe, Marketing Europe as a tourist destination, Tourism in Central and Eastern Europe, New trends in the European tourist industry
Number of Credits	4

Course Code	Y-ERAS4171
Title:	**Elements of Marketing**
Teacher:	**Edina LENDVAI**
Contact:	lendvai@mk.u-szeged.hu
Level	BSc (minimum 5 students)
Termin	spring semester (2 lessons a week) (mark: 1,3,5)
Module Aims	Aim of the course is to learn more about marketing and advertising. Students have exercises how to use marketing tools in practice. Marketing and engineering.
Module Subject	Introduction to marketing and advertising: Jobs and responsibilities, Corporate identity, logos, Branding Finding the customer: Market research, Customer profiles, Data collection, A telephone survey Planning a marketing strategy: The marketing plan, The four Ps, Pricing and positioning strategies Creating ads: The AIDA model for advertising, Working with an ad agency, Advertising channels, Rate sheets Marketing tools: Distribution channels, Types of discount, Types of retailer, Telemarketing, Direct marketing Presenting your public face: Public relations, Websites as a marketing tool, Sponsoring, Effective press releases Marketing through trade fairs: Giveaways, Organizing events, Attending a trade fair
Number of Credits	4

Course Code	Y-ERAS4051
Title:	**Business & Management**
Teacher:	**József GÁL**
Contact:	galj@mk.u-szeged.hu
Level	BSc (minimum 5 students)
Termin	fall or spring semester (2 lessons a week) (mark: 1,3,5)
Module Aims	Aim of the course is to introduce terminology and most important parts of business & management.
Module Subject	Industrial plant, enterprise, enterpriser and manager, subject of business, administration and scientific administration, selection of profession, enterprising and management, market conditions and production factors, production costs, plant sizes, plant location, juridical organization of plants, internal organization of plants, order, supervising and functional authority, centralization and delegation of authority, principles of organization, financial policies and sources.
Number of Credits	4

Course Code	Y-ERAS4111
Title:	**Customer Care**
Teacher:	**József GÁL**
Contact:	galj@mk.u-szeged.hu
Level	BSc (minimum 5 students)
Termin	fall or spring semester (2 lessons a week) (mark: 1,3,5)
Module Aims	Aim of the course is to introduce in flight and on board services. Students learn about airport technology, passenger safety, ground movements and services during flight. Some practical aspects are also part of the subject.
Module Subject	Introduction to customer care: Customer care success, Customer care business and jobs, Surprising facts about customer care Face to face with customers: Body language, A company visit, Meeting do's and don'ts, At a trade fair, The invisible customer Dealing with customers on the phone: General telephoning, The 'customer care' phone call, What the customers really hear Call center success: Taking an order, Hotline (Troubleshooting), Customer-centered call centers Delivering customer care through writing: Effective letters and emails, Format and informal writing styles, The five Cs of customer care writing, A case study Dealing with problems and complaints: Complaint strategies and policies, The letter of apology, Explaining company policy, Some opinions about complaints and apologies
Number of Credits	4

Course Code	Y-ERAS4061
Title:	**Sales & Purchasing**
Teacher:	**József GÁL**
Contact:	galj@mk.u-szeged.hu
Level	BSc (minimum 5 students)
Termin	fall or spring semester (2 lessons a week) (mark: 1,3,5)
Module Aims	Aim of the course is to introduce in sales and purchasing in engineering. Students learn about how to buy and sell, manage trade in engineering. Some practical aspects are also part of the subject.
Module Subject	Job and responsibilities: Job titles and tasks, A sales meeting, A sales meeting, A requisition New contacts: At a trade fair, Relationship building, Fellow-up emails Offers: A sales pitch, The AIDA approach to sales, A request for proposal, An offer letter Negotiations: Tips for successful negotiations, A company visit, Negotiating styles, Win-win negotiations Orders: Telephone orders, An online order, A change to an order, Numbers and figures, Contract term and phrases Customer care: Dealing with problems over the telephone and in writing, An online complaint form
Number of Credits	4

Course Code	Y-ERAS4161
Title:	**Economics**
Teacher:	**József GÁL**
Contact:	galj@mk.u-szeged.hu
Level	BSc (minimum 5 students)
Termin	fall or spring semester (2 lessons a week) (mark: 1,3,5)
Module Aims	Aim of the course is to introduce the logistics, basic definitions and terminology. Some practical aspects are also part of the subject.
Module Subject	The General Theory of the Goods. Economy and Economic Goods. The Theory of Value. The Theory of Exchange. 4 Principles of Economics. Use Value and Exchange Value. The Theory of the Commodity. The Theory of Money. Macroeconomics. Case studies and presentations.
Number of Credits	4

Course Code	Y-ERAS4071
Title:	**Logistics**
Teacher:	**József GÁL**
Contact:	galj@mk.u-szeged.hu
Level	BSc (minimum 5 students)
Termin	fall or spring semester (2 lessons a week) (mark: 1,3,5)
Module Aims	Aim of the course is to introduce the logistics, basic definitions and terminology. Some practical aspects are also part of the subject.
Module Subject	Introduction to logistics: Setting the scene; Job in logistics; Regular activities Logistics services: Logistics acronyms; Product ranges; 3PL providers; Value-added services Inventory management and procurement: Inventory management; Continuous replenishment; Job advertisements Modes of transport: Transport and handling equipment; Container types, Types of goods Planning and arranging transport: Transport options, Measurements, Quotations Shipping goods: Marking, Loading, Advice of shipment, Shipping instructions Warehousing and storage: Handling equipment, Warehouse areas, Warehousing today Documentation and finance: Documents in foreign trade, Import instructions, Payment methods
Number of Credits	4

Course Code	Y-ERAS4201
Title:	**Business planning**
Teacher:	**Árpád BENKŐ-KISS**
Contact:	benko-ka@mk.u-szeged.hu
Level	BSc (minimum 5 students)
Termin	fall or spring semester (2 lessons a week) (mark: 1,3,5)
Module Aims	Aim of the course is to introduce most frequent methods and parts of Business planning, and financial calculations.
Module Subject	Basics of Accounting, The Balance sheet and Income statement Securities, Financial calculations, Credits, and paybacks, Turnower NPV, IRR, Marketing, Financial ratios, Brake even analysis, Financial calculations- interest and compound interest, Geometric series in financial calculations Depreciation, Risk analysis, Cost Benefit Analysis CBA)
Number of Credits	4

Course Code	Y-ERAS4211
Title:	**Human Resource Management**
Teacher:	**Sándor NAGY**
Contact:	nagys@mk.u-szeged.hu
Level	BSc (minimum 5 students)
Termin	fall or spring semester (2 lessons a week) (mark: 1,3,5)
Module Aims	Aim of the course is to introduce the human resource management. Some practical aspects are also part of the Course.
Module Subject	What is HRM? Basics of the HRM. Understanding the logic of the management of the human resources. Challenges and new aspects of the topic. E.g. focusing on engineering aspects, managing the elderly workforce at the BMW car manufacturer, creativity management and its connections to engineering dimensions, complexity management affecting the HRM.
Number of Credits	4

Course Code	
Title:	**Startup-ecosystems, Competitiveness and Sustainability**
Teacher:	**Sándor NAGY**
Contact:	nagys@mk.u-szeged.hu
Level	BSc (minimum 5 students)
Termin	fall or spring semester (2 lessons a week) (mark: 1,3,5)
Module Aims	Aim of the course is to introduce the logic of the competitiveness and the extended interpretation of sustainability in the field of competitive sector.
Module Subject	Understanding the definitional evolution of the notion of competitiveness and sustainability. The content of the value creation-based competitiveness regarding the competitive sector Startup-ecosystems, innovation attitudes of startup companies "Engineering the value creation" 7 pillars of the sustainability Strategic aspects of the competitiveness (Blue Ocean Strategy, sustainable competitiveness and how to harmonize the competitiveness and sustainability) Innovation – sustainability – competitiveness Case Studies
Number of Credits	4

Course Code	Y-ERAS4231
Title:	**Strategic Management**
Teacher:	**Árpád BENKŐ-KISS**
Contact:	benko-ka@mk.u-szeged.hu
Level	BSc (minimum 5 students)
Termin	fall or spring semester (2 lessons a week) (mark: 1,3,5)
Module Aims	Aim of the course is to introduce the strategy management. Some practical aspects are also part of the subject.
Module Subject	Methodology of strategic planning. The environment of strategy (collecting facts, etc). Strategy formulation (formulation of the target image, selection of target groups, etc.) Strategy implementation. Strategy evaluation and control.
Number of Credits	4

Course Code	Y-ERAS4261
Title:	**Corporate Finance for Engineers**
Teacher:	**Brigitta ZSÓTÉR**
Contact:	zsoterb@mk.u-szeged.hu
Level	BSc (minimum 5 students)
Termin	fall or spring semester (2 lessons a week) (mark: 1,3,5)
Module Aims	Aim of the course is to introduce the finance, basic definitions and indicators. Some practical aspects are also part of the subject.
Module Subject	Introduction to corporate finance: The role of the financial manager. Separation of ownership and management. Financial markets. Present Value. Net Present Value. NPV Rule. ROR Rule. Opportunity Cost of Capital. Managers and the Interests of Shareholders. Valuing Long-Lived Assets. PV Calculation. Short Cuts. Compound Interest. Nominal and Real Rates of Interest (inflation). Example: Present Values and Bonds. How Common Stocks are Traded? How to Value Common Stock? Capitalization Rates. Stock Prices and EPS. Discounted Cash Flows and the Value of a Business. Why Net Present Value Leads to Better Investment Decisions than Other Criteria?
Number of Credits	4

Course Code	
Title:	**IT today**
Teacher:	**György HAMPEL**
Contact:	hampel@mk.u-szeged.hu
Level	BSc (minimum 5 students, maximum 20 students)
Termin	fall or spring semester (2 lessons a week) (mark: 1,3,5)
Module Aims	The aim of the course is to give an overview of the practical use of today's information technology.
Module Subject	The concept of data, information, computer science, computer architecture, computer. Computer groups. Data measurement and data units. Numeral systems. Systems to represent numbers (binary, decimal, hexadecimal numbers). Character coding. Logical operations and gates. Computer hardware. Parts of a personal computer. Software. Groups of software by services and availability. Copyright. Computer networks. Users, topology, hardware, and software. The internet services. Operating systems and file management. Multimedia, MPC. Lossless and lossy compression. Vector and pixel graphics. Movie and sound. Office applications. Main services. Word processing, presentations, spreadsheets, database-management etc. Database management. The main models: entity-relationship and relational model. Programming basics. Source, interpreter, and compiler. Creating algorithms with flow chart and pseudo code.
Number of Credits	4

Course Code	Y-ERAS4281
Title:	**Database management**
Teacher:	**György HAMPEL**
Contact:	hampel@mk.u-szeged.hu
Level	BSc (minimum 5 students, maximum 20 students)
Termin	fall or spring semester (2 lessons a week) (mark: 1,3,5)
Module Aims	The aim of the course is to give an overview of data models and the MySQL open source relational database management system
Module Subject	The concept of data, information, database and database management system. The steps of designing and creating a database. Modelling databases in general. The entity-relationship model and the relational data model. Converting from ER to relational model. The purpose of normalization. Anomalies, redundancy and dependencies. Converting tables into normal forms. Relational algebra. The Structured Query Language (SQL): syntax, statement data types and functions. Creating and managing databases with MySQL open source relational database management system: creating models and converting them to database tables; creating, modifying and deleting databases and tables; creating relationships between tables; data input and output; creating queries. Database security.
Number of Credits	4

Course Code	Y-ERAS4291
Title:	**Introduction to Public Finances**
Teacher:	**Sándor NAGY**
Contact:	nagys@mk.u-szeged.hu
Level	BSc (minimum 5 students)
Termin	fall or spring semester (2 lessons a week) (mark: 1,3,5)
Module Aims	Aim of the course is to introduce the logic of public finance management, the public decisions, the components and the contribution of the public finance system to sustainability and competitiveness.
Module Subject	Understanding the definitional evolution of the notion of public finances and the public finance management, the competitiveness and sustainability as well. The components of public finance system The functions of the public finance system Public decisions How to design and implement the budget The role of control mechanisms Contribution to the state level competitiveness and sustainable development Case Studies
Number of Credits	4

Course Code	Y-ERAS4101
Title:	**Cross-border Cooperation**
Teacher:	**Sándor NAGY**
Contact:	nagys@mk.u-szeged.hu
Level	BSc (minimum 5 students)
Termin	fall or spring semester (2 lessons a week) (mark: 1,3,5)
Module Aims	The course introduces the basic knowledge about border theory and applied regional policy. The focus will be mainly put on the regional policy of the European Union, its programs and their effects on the border zones in Europe. In addition, case studies will be demonstrated.
Module Subject	The European space, Macrostructures in Western and Eastern Europe, Definitions of border, Border theories, Border regions in Europe and in Hungary, Cross-border agglomerations, Touristic aspects of borders
Number of Credits	4

Course Code	NOEET131_EN
Title:	**Food Economy and Marketing**
Teacher:	**Edina LENDVAI**
Contact:	lendvai@mk.u-szeged.hu
Level	MSc, BSc (minimum 5 students)
Termin	fall semester (2 lessons a week) (mark: 1,3,5)
Module Aims	To know the most important elements of the marketing. To able to plan the marketing strategy, with the elements of the marketing mix.
Module Subject	The definition-change of the marketing. The history of the marketing. The segmentation, targeting and positioning. The marketing research. The marketing mix. 4 P, 7 P, 4 C
Number of Credits	4

Course Code	
Title:	**Business Communication**
Teacher:	**Brigitta ZSÓTÉR**
Contact:	zsoterb@mk.u-szeged.hu
Level	MSc, BSc (minimum 5 students)
Termin	fall or spring semester (2 lessons a week) (mark: 1,3,5)
Module Aims	Aim of the course is to introduce the business communication. Some practical aspects are also part of the subject.
Module Subject	Stakeholders. The levels of the business ethics. The definition of communication. The channels and kinds of the communication. Verbal communication. Not verbal communication. Presentation. Business talk. Negotiation techniques.
Number of Credits	4

Course Code	Y-ERAS4371
Title:	**Project management and investment**
Teacher:	**Árpád BENKŐ-KISS**
Contact:	benko_ka@mk.u-szeged.hu , arpadbenko@gmail.com
Level	BSc (minimum 5 students)
Termin	spring semester (2 lessons a week) (mark: 1,3,5)
Module Aims	Aim of the course is to develop projects including the planning process, including the the financial analysis, calculations and risk analysis.
Module Subject	- Project development planning tools and methods. - Project development process, prepare and decision making. - Project management members and roles. - Financial background and calculations (investment, operation, turnover). - Sensitivity profitability and efficiency. - Communication plan and stakeholders - Case studies, based on real projects
Number of Credits	4

Course Code	
Title:	**Mastering Word**
Teacher:	**György HAMPEL**
Contact:	hampel@mk.u-szeged.hu
Level	BSc (minimum 5 students, maximum 20 students)
Termin	fall or spring semester (2 lessons a week) (mark: 1,3,5)
Module Aims	Microsoft Word is a very popular word processing software although most of its users do not use several of the functions that are available to simplify text editing. The aim of the course is to show the methods that can be used to make word processing more effective especially when working with large documents.
Module Subject	Working with text, tables and graphics: Creating, inserting text, graphics and tables into a document. Formatting: Custom formatting of text, paragraphs, tables. Formatting with styles, creating and using custom styles. Creating and using templates. GUI customization: Creating and using custom menus and ribbons. Object linking and embedding: Inserting different types of objects into documents. Merging documents. Referencing: Creating and using captions, footnotes, endnotes. Creating citations and bibliography. Reference headers, tables, figures, equations etc. Creating and using cross-references. Fields: Creating and using fields and forms. Merged documents: Merge documents with databases and creating circulars, reports. Automation: Creating and using macros. Collaborative editing: Tracking and reviewing documents. Securing documents. Preparing outputs: Inserting and formatting section breaks. Document setup. Spelling and thesaurus.
Number of Credits	4

Course Code	
Title:	**Data analysis with Excel**
Teacher:	**György HAMPEL**
Contact:	hampel@mk.u-szeged.hu
Level	BSc, MSc (minimum 5 students, maximum 20 students)
Termin	fall or spring semester (2 lessons a week) (mark: 1,3,5)
Module Aims	The use of Microsoft Excel is widespread in the industry. The aim of the course is to give an overview of the powerful data analysis tools of the program which can be used in most businesses even in their day-to-day functioning.
Module Subject	Importing data into Excel. Basic Data manipulation. Basic functions. Using references. Search functions and statistical functions. Database manipulation and filtering. Pivot tables. Creating (custom) charts. Number formats and conditional formatting. Using Solver, Goal-seek, Scenario Analysis, Analysis ToolPak, Power Map and PowerPivot plugins. Extending data analysis with Microsoft Power BI.
Number of Credits	4

Course Code	
Title:	**Information management**
Teacher:	**György HAMPEL**
Contact:	hampel@mk.u-szeged.hu
Level	BSc, MSc (minimum 5 students, maximum 20 students)
Termin	fall or spring semester (2 lessons a week) (mark: 1,3,5)
Module Aims	The aim of the course is to give an overview of the usefulness of information in managing enterprises and decision making, and the features, development and use of information systems.
Module Subject	Interpretation of data, information, and knowledge. The role of information in decision making. Basic concepts of systems theory. Overview of the hardware and software background that supports data and information management. The main organizational forms and related information systems. The concept of information management and its basic tasks. The main types and services of information systems. The features of decision support systems. Creating computer information systems. Systems analysis techniques and system development. Factors affecting the selection of IT equipment for information management.
Number of Credits	4

Course Code	
Title:	**Building energy**
Teacher:	**Sandor Jozsef FORRAI**
Contact:	forrai.sandor.jozsef@gmail.com
Level	BSc (minimum 5 students)
Termin	fall or spring semester (0+2 lessons a week) (mark: 1,2,3,4,5)
Module Aims	To teach the basics of building engineering and building energy to students through the acquisition of knowledge related to the topic.
Module Subject	Passive houses Energy classification of buildings Building Information Modeling/Management (BIM) Termocamera
Number of Credits	5

Course Code	
Title:	**Computer Aided Design and Modeling**
Teacher:	**Sandor Jozsef FORRAI**
Contact:	forrai.sandor.jozsef@gmail.com
Level	BSc (minimum 5 students)
Termin	fall or spring semester (0+2 lessons a week) (mark: 1,2,3,4,5)
Module Aims	Improving the student's knowledge in the field of computer-aided design. Demonstrate the management of parametric solid state design software using Autodesk Inventor. During the semester, students create an independent assignment, which is presented in the software or in a presentation at the end of the semester.
Module Subject	The basics of 3D modeling in Inventor Solid modeling Assembly modeling Modeling of moving parts in Inventor Frame modeling Exploded view and animation
Number of Credits	4

Course Code	
Title:	**Programming of Industrial Robots**
Teacher:	**Peter SARCEVIC**
Contact:	sarcevic@mk.u-szeged.hu
Level	BSc (minimum 5 students)
Termin	fall semester (0+2 lessons a week) (mark: 1,3,5)
Module Aims	The aim of the course is to introduce the programming of FANUC and ABB industrial robots using real robots and simulation software.
Module Subject	Introduction to basics of industrial robots. Programming of FANUC robots using TeachPendant. Programming techniques: coordinate systems, movement types, speed, Tool Center Point (TCP) teaching, defining User Frames, offsets and position registers, advanced programming, inputs/outputs, different types of stops. Programming of FANUC robots in RoboGuide software. Introduction to manual programming of ABB industrial robots using FlexPendant. Programming of ABB robots in RobotStudio software.
Number of Credits	4

Course Code	NOEET041_EN/1
Title:	**Biotechnology and Enzymology**
Teacher:	**Anita VIDÁCS**
Contact:	vidacsa@mk.u-szeged.hu
Level	BSc/MSc (minimum 5 students)
Termin	spring semester (2 lessons a week) (mark: 1,3,5)
Module Aims	Aim of the course is to introduce most important parts of biotechnology.
Module Subject	This course is designed to give students understanding of the role of microorganisms in biotechnology; the different fermentation methods; classical and modern stages of biotechnology; types of biotechnology (red, green, white, blue); different enzymes which are used in different biotechnology methods.
Number of Credits	3

Course Code	
Title:	**Power Electronics and Electronic Circuit Design**
Teacher:	**Massimo STEFANONI, Ákos ODRY**
Contact:	sarcevic@mk.u-szeged.hu
Level	BSc (minimum 5 students)
Termin	fall semester (2 lessons a week) (mark: 1,3,5)
Module Aims	The aim of the course is to introduce the basic power electronic components and some related applications for power conversion.
Module Subject	This course introduces to the main concepts and principles of the electronic components used in power conversion systems. Diode, BJT, Thyristor, JFET, MOSFET, TRIAC, DIAC, GTO, and

	IGBT are presented introducing for each of them the structure, the electrical current-voltage characteristic, the model, and the applications for basic Power Conversion Systems such as rectifiers and inverters. Examples of PWM techniques are presented. The heat dissipation problem is presented and deal with the equivalent thermal circuit in a generic case.
Number of Credits	4

Course Code	
Title:	**Electric Machines**
Teacher:	**Massimo STEFANONI, Peter SARCEVIC**
Contact:	sarcevic@mk.u-szeged.hu
Level	BSc (minimum 5 students)
Termin	spring semester (2 lessons a week) (mark: 1,3,5)
Module Aims	The aim of the course is to introduce the basic notions of the main electrical machines.
Module Subject	This course introduces to the main concepts and principles of electrical machines describing the related configurations, the equivalent electrical circuits, the control drives, and the applications. The presented electrical machines are: transformer, ac generator, synchronous motor, asynchronous motor, dc motors, brushless motors, step motors.
Number of Credits	4