

Course Code	Course Name	Description	ECTS	Course Webpage
251+A2: A11221	Food Plant Design	The purpose of this course is to familiarize students with the process of food plant design, which is considered the most intricate task that food engineers undertake. It involves combining the design of the production line with the corresponding production facility to manufacture food products with the least possible expenses for equipment, energy, labor, and related costs. Furthermore, the process must comply with all quality requirements and hygiene standards set by the relevant regulations.	4.00	http://www.pbf.unizg.hr/en/departments/department_of_food_engineering/section_for_food_plant_design/food_plant_design
196367	Nutrigenomics	Incurrence of disease involving single or several genes. The impact of evolution and gene variants on nutrigenomics. Molecular mechanisms of interactions gene and nutrient as well as nutrients and humans genotype. Nutrient impact on the regulation of gene expression. The impact of gene variants, nutritional parameters on appearance of cardiovascular diseases, diabetes, obesity, arthritis, and cancer.	4.00	http://www.pbf.unizg.hr/en/departments/department_of_biochemical_engineering/laboratory_for_bioinformatics/nutrigenomics
192020	Food Packaging	Definitions, functions and classification of packaging materials (basic, with regard to: waste, handling, material type). Functions and importance of food packaging. Materials (wood; glass, metal, paper, plastics, laminates, biodegradable and edible materials). Packaging manufacture (injection moulding, pressing, blowing, extrusion, calendering, blow moulding, two- and three-piece metal cans production, glass and plastic bottles manufacture). Packaging forms and shapes (covers, bags and pouches, boxes, barrels, containers, bottles, cans, jars, etc. Stoppers and Closures. Packaging methods: aseptic, vacuum, modified/controlled atmosphere, active and intelligent packaging, microwave packaging (susceptors). Food-package interaction (gas and water vapour permeability, corrosion, migration). Food contact material (FCM) regulations. Packaging and environment.	4.00	http://www.pbf.unizg.hr/en/departments/department_of_food_engineering/laboratory_for_food_packaging/food_packaging
192093	Selected Topics in Food packaging	Functional requirements of packaging materials. Protective laquers on food cans with regard to food type. Multilayer (laminates) and composite (metallised, susceptors) materials. Advances in food packaging materials and methods. Storage conditions. Selection of food packaging material for fresh, dehydrated, processed food (thermal, non-thermal). Food-package interaction. Legislation in food packaging. Selection of food packaging material and method with regard to food product (student presentation on selected food product).	3.00	http://www.pbf.unizg.hr/en/departments/department_of_food_engineering/laboratory_for_food_packaging/selected_topics_in_food_packaging
196345	Shelf Life of Packaged Foodstuffs	General Shelf Life Analysis Requirements. Effect of packaging material on product shelf-life. Barrier characteristics of packaging materials. Factors affecting permeation characteristics of packaging materials. Packaging permeation on: gases, water vapour. Effect of packaging methods on product	3.00	http://www.pbf.unizg.hr/en/departments/department_of_food_engineering/laboratory_for_food_packaging/food_packaging

		shelf-life. Effects of environmental factors on product shelf-life. Shelf-life protocols: Challenge study; Accelerated shelf life testing; Confirmatory storage study; On-going shelf life monitoring. Food-package interaction (corrosion, migration: global, specific). Packaging and moisture transfer. Permeability and Shelf Life. Water Vapor Permeability of Packaging: Moisture gain; Moisture loss solution. Evaluation of the rate of oxidation of foods packaged in a semipermeable pouch. Oxygen permeation. Packaging laws and regulations. The kinetic model. Seminars: Shelf-life determination: case studies. Tasks definition and allocation. Seminars presentation by students.		or food packaging/shelf life of packaged foodstuffs
210379	Biotransformations	Defining biotransformation processes and indicating its advantages in the production; Establishing biotransformation process: selection of biocatalysts, solvents and bioreactors for a typically biotransformation; Process parameters optimization and scale-up	3.00	http://www.pbf.unizg.hr/en/departments/department_of_biochemical_engineering/laboratory_for_cell_culture_technology_and_biotransformations/biotransformations
192024	Modelling and Optimisation in Nutrition	Application of conceptual and mathematical models in food science- their role and importance. Using tables of the chemical composition of foods to calculate the energy and nutritional content of a new product and/or dish, menu. Optimizing the composition of a new product and/or menu.	4.00	http://www.pbf.unizg.hr/en/departments/department_of_process_engineering/laboratory_for_measurement_control_and_automatisation/modeling_and_optimization_in_nutrition
192021	Modelling in Food Engineering	Application of conceptual and mathematical models in the profession. Key variables in the models - analysis of examples from the profession	3.00	http://www.pbf.unizg.hr/en/departments/department_of_process_engineering/laboratory_for_measurement_control_and_automatisation/modelling_in_food_engineering
251225	Basics of Measurement Methods in Nutrition	Direct and indirect measurement methods, measurement units and data that are key in nutrition for monitoring body composition or food. Analysis of examples and reasoning based on professional cases.	3.00	http://www.pbf.unizg.hr/en/departments/department_of_process_engineering/laboratory_for_measurement_control_and_automatisation/basics_of_measurement_methods_in_nutrition
191415	Genetics of Industrial Organisms	In this module, students will learn how to analyze mixed bacterial cultures and what is their response to stress. Also, they will observe changes during bacterial growth in the extended stationary phase and get familiar with another important aspect is communication between bacteria and biofilm formation as a consequence of stressful conditions. During this course,	3.00	http://www.pbf.unizg.hr/en/departments/department_of_biochemical_engineering/laboratory_for_biology_and_micro

		students will learn how to modify gene by chemical and / or physical mutagenic agents or by genetic engineering, they will acquire knowledge about methods of genotypisation and explain the role of non coding RNAs in genomics and epigenetics.		bial genetics/genetics of industrial organisms
196347	Ecogenetic Studies	Students will be able to describe the types of toxic agents in the environment and the mechanisms responsible for toxicity at the molecular level, and at the level of the individual, population and the ecosystem as a whole, describe the consequences of short-term and long-term exposure of organisms to environmental contaminants, explain the relationship between the concentration and effect of toxic agents with respect to the physicochemical characteristics of the agent, their availability during absorption, metabolism, distribution, elimination, bioaccumulation and biomagnification, discuss theoretical assumptions and concepts, and experimental evidence of the effects of endocrine disruptors on the animal or human organism. define endocrine disruptors, identify the hypotheses and theoretical assumptions on which the scientific papers were made, and to analyze the scientific methods, results and conclusions published in the relevant works through seminar expositions, develop communicative skills on scientific concepts, hypotheses, results and interpretation of results through seminar dissemination.	3.00	http://www.pbf.unizg.hr/en/dpartments/department of biochemical engineering/laboratory for biology and microbial genetics/ecogenetic studies
196373	Mechanisms of Evolution	Students will learn about phylogenetic trees, the evolutionary tree and the three domains of life on Earth; the difference between the last universal common ancestor (LUCA); processes during the evolution of prokaryotic cells and the formation of the first eukaryotic cell; the difference between the basic processes of evolution: variation, natural selection (selection), genetic deflection, genetic flux and hereditary genetic variants ; the origin of the virus, the connection between the virus and the origin of the three domains, the daily role of virus in cell evolution. Also, theory of life and human evolution will be analyzed in details.	3.00	http://www.pbf.unizg.hr/en/dpartments/department of biochemical engineering/laboratory for biology and microbial genetics/mechanisms of evolution
207536	Organic Chemistry	The objective of the course is to provide students with a basic knowledge of organic chemistry and mastery of practical laboratory techniques used in the synthesis, isolation, and purification of organic compounds.	6.00	http://www.pbf.unizg.hr/en/dpartments/department of chemistry and biochemistry/laboratory for organic chemistry/organic chemistry2
196365	Powder Technology	The course objective is to acquaint the students with the definition of powders and powder technology and to explain to which extent and why the powders are used. The students should also be able to explain the advantages and the disadvantages of powder use as raw materials and end products. Furthermore, the students are acquainted with basic	3.00	http://www.pbf.unizg.hr/en/dpartments/department of process engineering/section for fundamental engineering/powder technology

		particle and powder properties and the technological processes in the production and handling of powders: milling, mixing, sampling, drying, agglomeration, tableting and encapsulation. The student will be able to use the acquired theoretical skills to choose the adequate equipment for powder sampling, milling, mixing, drying and other powder handling and production processes.		
251227	Basics of Tissue Engeneering	Introduction into tissue engineering (TE) methods and principles. Defining cell types and cell sources for TE. Cell maturation and differentiation in vitro. Selection and fabrication of natural and synthetic materials applied for cell immobilization and tissue analogues scaffolds. Comparing current achievements and limitations in TE.	2.00	http://www.pbf.unizg.hr/en/departments/department_of_biochemical_engineering/laboratory_for_cell_culture_technology_and_biotransformations/basics_of_tissue_engineering
251228	Novel Food Processing Techniques	Development of new food processing techniques. Advanced thermal techniques. Advanced oxidation processes in the food industry. Application of electrical technologies (Plasma, PEP), ultrasonic food processing, pulsed light food processing, high pressure food processing, supercritical CO2 extraction and microwave heating, 3D food printing.	5.00	http://www.pbf.unizg.hr/en/departments/department_of_food_engineering/laboratory_for_food_processes_engineering
196371	Basics of Bioinformatics	The course covers an introductory level of bioinformatics. It includes commonly used bioinformatics tools and algorithms as well as standard formats, with the focus on biological sequence data and subsequent data analysis. The topics include sequence alignment, motif detection, conservation analysis, Markov models and NGS sequencing. Web-based tools and databases are also covered.	4.00	http://www.pbf.unizg.hr/en/departments/department_of_biochemical_engineering/laboratory_for_cell_culture_technology_and_biotransformations/basics_of_tissue_engineering
39803	Biochemical Engineering	Definition, importance and range of biochemical engineering and its development directions Bioreactor systems for biotechnological production Bioprocess conduction manners – batch and fed batch process Bioprocess conduction manners – semi-continuous and continuous process Mixing and aeration in bioprocesses Application of mathematical models in biotechnological production	8.00	http://www.pbf.unizg.hr/en/departments/department_of_biochemical_engineering/industrial_microbiology_and_malting_and_brewing_technology/biochemical_engineering