| | Course Code | Course Name | Description | ECTS | Prerequisites | ISCED Code | Academic Year | Semestar | Study level |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 39854 | **Biotransformations** | "<br>Defining biotransformation processes and indicating its advantages in the production; Establishing biotransformation process: selectibiocatalysts, solvents and bioreactors for a typically biotransformation; Process parameters optimization and scale-up" | **3,00** | | 0721 | 2026-27 | Summer/Winter | Master |
| 2 | **53286** | **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 | Chemistry and technology of cereals; Hygine and Sanitation | 0721 | 2026-27 | Summer | Master |
| 3 | **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 | | 0510 | 2026-27 | Summer | Master |
| 4 | **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 | | 0721 | 2026-27 | Summer/Winter | Master/Bachelor |
| 5 | **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 | | 0721 | 2026-27 | Summer/Winter | Master/Bachelor |
| 6 | **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 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. | 3,00 | | 0720 | 2026-27 | Summer/Winter | Master/Bachelor |
| 7 | **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 | | 0720 | 2026-27 | Summer | Master/Bachelor |
| 8 | **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 | | 531 | 2026-27 | Winter | Master/Bachelor |
| 9 | **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 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. | 3,00 | | 0720, 0721 | 2026-27 | Smmer | Bachelor |
| 10 | **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 | | 0510 | 2026-27 | Winter | Master |
| 11 | 53685 | **Food Process Engineering 2** | 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 | | 0721 | 2026-27 | Summer | Master |
| 12 | **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 | | 0510 | 2026-27 | Summer | Master |
| 13 | **39803** | **Biochemical Engineering** | Definition, importance and range of biochemical engineering and its development directions<br>Bioreactor systems for biotechnological production<br>Bioprocess conduction manners – batch and fed batch process<br>Bioprocess conduction manners – semi-continuous and continuous process<br>Mixing and aeration in bioprocesses<br>Application of mathematical models in biotechnological production | 8,00 | | 0510 | 2026-27 | Winter | Bachelor |
| 14 | 173442 | **Probiotics and starter cultures** | Pobiotic, prebiotic and sybiotic concept Production and application of probiotics | 3,00 | | 0721 | 2026-27 | Summer | Master/Bachelor |
| 15 | **54283 (DN)** | **Gut microbiota, food and health** | The role of intestinal microbiota in human health . Metabolic activity of the intestinal microbiota.<br>The impact of nutrition on intestinal microbiota. Restoring the balance of the disturbed intestinal microbiota | 4,00 | | | 2026-27 | Summer | Master/Bachelor |
| 16 | **253087** | **Industry 4.0 in Biotechnical Sciences** | Area - Industry 4.0 ( a) Internet of Things (IoT) and cloud computing; b) Additive production and 3D printing; c) Industrial big data (Big Data); d) Vision technologies (augmented reality/virtual reality/computer vision); e) Automation and intelligent robotics; f) Cybersecurity. Productivity measurement in a production company (Productivity); Overall equipment efficiency model (OEE). Circular economy (CE). The term "smart factory". | 3,00 | | 0711, 0712, 0720, 0721, 0788, 0528, 0618 | 2026-27 | Summer | Master/Bachelor |
| 17 | **253085** | **Sustainability of advanced food processing technologies** | Main characteristics of advanced thermal, mechanical and nonthermal techniques of food processing and by-products from the agri-food chain (wastewater from the agri-food chain, biomass, algae and microalgae, etc.). Sustainable processing techniques, usage of advanced thermal, mechanical, and advanced oxidative nonthermal processing techniques. Regulations applied to the use/characterization of these sustainable techniques, how to identify and use sustainable techniques according to existing EU regulations on the application and recognition of sustainable techniques (Life cycle assessment, Zero waste), and evaluate product quality (Quality function index and deployment). The environmental aspects of sustainable food processing techniques and agri-food waste (by-products). Usage of by-products from the agri-food chain as recycled raw materials or energy. | 3,00 | | 0711, 0712, 0720, 0721, 0788, 0528, 0618 | 2026-27 | Summer | Master/Bachelor |
| 18 | **191416** | **The fundamentals of bioorganometallic chemistry** | Bioorganometallic chemistry investigates biologically active complexes in which classical organometallic ligands and biomolecules are linked by carbon metal bonds. Bioconjugates of organometallic compounds and biomolecules (DNA, carbohydrates, steroids, amino acids, peptides) are used in cancer and infectious disease therapy, immunoassays, molecular recognition, enzyme catalysis and toxicology. The aim of this course is to familiarise students with the possibilities of using bioorganometallic compounds in pharmacology and biotechnology, with a focus on bioorganometallic complexes of particular biological and medical importance. | 3,00 | | 0510 | 2026-27 | Winter | Master/Bachelor |
| 19 | **191417** | **Peptidomimetics and pseudopeptides** | The disadvantages of natural peptides (proteolytic instability, polarity, conformational freedom) can be overcome by using their mimetics. Potential peptidomimetics include small peptide or nonpeptide molecules that mimic the fragment of the peptide secondary structure (helix, beta sheet, turn) involved in molecular recognition. By conformational analysis of potential peptidomimetics in solution using standard spectroscopy techniques (IR, NMR and CD spectroscopy) and by comparing their secondary structure with the secondary structure of the original peptide, it is possible to predict the biological activity of peptidomimetics based on SAR (structure activity relationship) studies. The aim of this course is: (i) to familiarise students with the possibilities of overcoming the shortcomings of natural peptides by using their synthetic mimetics, (ii) to show that structural complementarity of ligands and receptors is a prerequisite for achieving biological activity, and (iii) to demonstrate the conformational analysis of peptides and their mimetics in solution by IR, NMR and CD spectroscopy. | 3,00 | | 0510 | 2026-27 | Winter | Master/Bachelor |
| 20 | **239467** | **Introduction to Biotechnology** | Basic terms and the essential principles from the field of the Biotechnology as well as<br>the newest trends in Biotechnology; Cirrcular Economy and Bieconomy will be introduced to students. | 3,00 | | 0510 | 2026-27 | Winter | Master/Bachelor |
| 21 | **269703** | **Introduction to Metabolic engineering** | Basic terms, principles and methods of Metabolic Engineering will be introduced to student. Consolidation of knowledge related to different metabolic pathways, primarily central carbon metabolism pathways, and their interconnections and inter-correlations will contribute to understanding of a basic metabolic network functioning within cells and consequences thereof. Special attention will be paid to widening of spectrum of substrates which can be utilized by a (micro)organism, then to selection and application of certain reactions or several reactions for degradation of a selected substrate, as well as to regulation/re-routing those desirable reactions/pathways under production bioprocess conditions in order to produce biochemical, (microbial) biomass or degrade some undesired compound in biotechnological industry | 3,00 | | 0510 | 2026-27 | Winter | Bachelor |
| 22 | **253089** | **Cereals Chemistry and Technology** | Grain morphology, microscopic structure and chemical composition of cereal grains; Storage and milling of cereal grains; criteria of flour quality; bread-making technology; soft wheat porducts - biscuits, crackers and cakes; pastry technology; pasta making; cereal snacks; breakfast cereals | 6,00 | | 0721 | 2026-27 | Winter | Master/Bachelor |

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| 23 | 165599 | Ultrasound in biotechnology and food technology | Ultrasound effects are possible due to cavitational effects created during the propagation of ultrasound waves in liquid media or as an air-born effect when the sound waves are spread through the air. In liquid medium cavitation as main mechanism of ultrasonic activity could lead to temporary or permanent changes in physico-chemical properties of treated raw material or final food product. Ultrasound could be assigned as invasive method and is known as High intensity ultrasound or High power ultrasound under the frequencies between 20-100 kHz. As frequency is higher cavitational effect is lower and changes on treated material decreased. | 3,00 | | 0721 | 2026-27 | Summer | Bachelor/Master |
| 24 | 252761 | Technological Procedures for Food Waste and By-Products Processing | Students will acquire knowledge and skills on technological processes for processing food waste and by-products. During the lecture, students will be shown techniques for processing waste generated by the food industry. They will gain knowledge about mechanical, diffusion and thermal processing operations. Students will gain knowledge about innovative waste processing techniques based on sonoporation and electroporation methods. Existing and innovative waste processing techniques will also be compared from the point of view of energy consumption, possible reduction of waste heat generation, as well as initial investments in innovations. Possible risks of investing in new technologies will be discussed. Students will learn which high-value compounds from waste can be processed and isolated using different techniques and in which branches of industry such products can be used. Students will learn the basics of legal regulations related to food waste. More environmentally friendly methods of waste transport will be described. | 3,00 | | 0721 | 2026-27 | Summer | Bachelor/Master |
| 25 | 253099 | Computer tools for modeling human nutrition | and by-products. During the lecture, students will be shown techniques for processing waste generated by the food industry. They will gain knowledge about mechanical, diffusion and thermal processing operations. Students will gain knowledge about innovative waste processing techniques based on sonoporation and electroporation methods. Existing and innovative waste | 3,00 | | 0721 | 2026-27 | Summer/Winter | Bachelor/master |
| 26 | 272964 | Storage and Handling of Packed Foods | processing techniques will also be compared from the point of view of energy consumption, possible reduction of waste heat generation, as well as initial investments in innovations. Possible risks of investing in new technologies will be discussed. Students will learn which high-value compounds from waste can be processed and isolated using different techniques and in which branches of industry such products can be used. Students will learn the basics of legal regulations related to food waste. More environmentally friendly methods of waste transport will be described. | 3,00 | | 0721 | 2026-27 | Summer/Winter | Bachelor/Master |
| 27 | 269702 | Bioprocess development and biotechnology company start-up | The aim of the course is to encourage creative, critical and independent work with the aim of mastering the basic skills and methods necessary for the successful start-up and development of a biotechnology company.<br>M1 Bioprocess development How to use new biotechnological discoveries and develop existing or (new) bioprocesses?<br>M2 Company start up "The Lean Start up"<br>Creating an idea about a product, service, process<br>Finding new areas of application<br>Business plan (summary, investor data, market justification, business venture description, SWOT analysis, finances, business plan, define risks, conclusion)<br>Methodology (vision/mission, hypothesis, test product and user interaction (market), metrics, adaptation, Gantt chart)<br>M3 Innovation and intellectual property in biotechnology<br>Innovation process methodology<br>Intellectual property and the basics of a modern patent protection in biotechnology<br>Ethical and legal regulations<br>Patent application example and patent related cost-benefit analysis<br>M4 Examples of good practice | 3,00 | | 0721 | 2026-27 | Summer/Winter | Bachelor/Master |
| 28 | 39859 | English for Specific Purposes 1 | The module is based on understanding and reading authentic scientific and occupational/vocational articles from the fields of science relevant for study courses. Based on these articles the skills of listening, reading, speaking and writing in English are improved. Grammar is reviewed on the basis of these texts. The students choose by themselves a topic that is of special interest for their work or study and write a seminar work. The seminar paper is worked out in the following manner: students search different sources (such as libraries, books, scientific magazines, Internet) and compose a corpus for their work. All the materials should be written in authentic English, (not translations). Then the students produce a glossary, a summary and notes (usually in the PowerPoint programme). After checking with the lecturer, student(s) present their paper in front of an auditorium composed of other students in the classroom and the lecturer. The presentation should take around 15-20 minutes, during which other students take notes, write down comments and questions. After the presentation questions are asked by other students, comments are offered and discussion is welcome. It is evident that this involves an interactive approach, and invites a dynamic exchange of thoughts, and prepares students for real-life situations they will find themselves in in their future work. | 3,00 | | 0711, 0712, 0720, 0721, 0788, 0528, 0618 | 2026-27 | Summer | Bachelor |
| 29 | 66859 | English for Specific Purposes 2 | The aim of this elective module is to further expand the students' vocabulary of the English language pertaining to their profession and to build on the acquired skills of understanding and expressing oneself on professional topics.The content of the course is adapted to the needs of the student.The selected topics logically follow the topics covered in the previous years of study. The interest of students and their expertise grow in parallel with the volume of their education, as well as the knowledge and skills acquired in undergraduate studies, so one of the goals of this course is to enable students to express the same knowledge, skills and competencies in English. In addition to the topics covered in the studies of Food Engineering, Bioprocess Engineering, Molecular Biotechnology, Nutrition and Food Safety Management, this module also deals with current relevant topics in the field of graduate studies at the Faculty of Food Technology and Biotechnology, University of Zagreb. | 3,00 | | 0711, 0712, 0720, 0721, 0788, 0528, 0618 | 2026-27 | Summer | Master |
| 30 | 53241 | Physiology of Industrial Microorganisms | The goal of the course is to acquaint the student with a holistic approach to the application, analysis and evaluation of methods, procedures and bioprocesses that are carried out using traditional and potential novel biocatalysts and the formation of new ideas and solutions in the modern biotechnological production. | 6,00 | | 0510 | 2026-27 | Winter | Master |
| 31 | 39768 | Food Preservation Processes | es during freezing and frozen storage. Evaporation. Concentration by freezing. Membrane processes. .Drying – principle, methods, equi | 5,00 | | 0721 | 2026-27 | Summer | Bachelor |
| 32 | 253078 | Development of new products in food industry | t. Phase of product launch on the market. Product Growth Phase. The maturity phase of the product. Introducing new areas of product | 2,00 | | 0721 | 2026-27 | Summer | Master |
| 33 | 192022 | Process Measurement and Control in Food Engineering | The course covers experience on the methodology of experiment planning in the biotechnical field (examples from the food industry) with an emphasis on measurements, and processing data for management purposes.<br>Acquisition of knowledge for the selection of measuring devices, measurement methods and measurement accuracy analysis and static evaluation of experimental results when measuring individual physics sizes in certain accuracy classes.<br>Introduction to the basic concepts of system control, structural forms of management and control based on the analysis of the dynamics of the system in technological processes, in the food industry. In addition to the theoretical basis, practical knowledge of PID regulator parameters for higher-level system models with time lag is also gained. | 3,00 | | 0721 | 2026-27 | Summer/Winter | Master |
| 34 | 22 | Management | Students will be introduced to business ethics and socially responsible business, risk management including crisis management,systematic innovation and the introduction of a new product, business financing and the impact of EU economic strategy on business decision-making in the organization. Students will be introduced to business ethics and socially responsible business, risk management including crisis management, systematic innovation and the introduction of a new product, business financing and the impact of EU economic strategy on business decision-making in the organization. Students will acquire the skills of analyzing the current state of the company, the impact of changes in the environment on the business strategy of the organization by applying appropriate tools (SWOT and PEST analysis, Ansoff matrix and analysis of financial performance indicators). | 3,00 | | 0711, 0712, 0720, 0721, 0788, 0528, 0618 | 2026-227 | Summer/Winter | Master |