İZMİR INSTITUTE OF TECHNOLOGY

FACULTY OF ENGINEERING, FOOD ENGINEERING DEPARTMENT

DESCRIPTION OF MANDATORY COURSES

Courses for Students Enrolled in the 2025-2026 Academic Year

MATH 141 Basic Calculus I (3+2) 4 ECTS: 5
Functions. Limits and continuity. Derivatives. Applications of Derivatives; Mean Value Theorem, Intermediate Value Theorem. Integration. Applications of Integrals; Volumes by slicing, Surface areas and Arc lengths, Transcendental functions. Integration Techniques; Substitution Rule, Trigonometric integrals, Integration by parts.

PHYS 101 General Physics I (2+2) 3 ECTS: 6
Scientific notation, length, time, mass, unit systems, dimensional analysis. Motion along a straight line. Motion in two and three dimensions. Force and Motion. Newton's laws and their applications. Kinetic energy, work, power, and potential energy. Systems of particles. Linear momentum and collisions. Rotation, angular momentum and its conservation. Equilibrium and elasticity. Gravitation.

PHYS 111 General Physics Laboratory I (0+2) 1 ECTS: 2
Experiments complementary to the course material related to the topics discussed in PHYS 101 General Physics I lectures will be carried out in this laboratory section.

MBG 121 Biology I (3+0) 3 ECTS: 5
The complex biological molecules and cellular structures, concepts of biological processes such as metabolism, inheritance, and cell communication at both molecular and cellular levels: Chemical context of life, water and life, carbon and molecular diversity of life, the structure and function of large molecules, cells and membrane structure and function, an introduction to metabolism, cellular respiration and fermentation, photosynthesis, cell communication, the cell cycle, meiosis and sexual life cycles, Mendel and gen idea, the chromosomal basis of inheritance, the molecular basis of inheritance, from gene to protein, regulation of gene expression, viruses, biotechnology, genomes and their evolution.

CHEM 121 General Chemistry I (3+0) 3 ECTS: 5
Matter-its properties and measurement. Atoms and atomic theory. Chemical compounds. Chemical reactions. Introduction to reactions in aqueous solutions. Gases. Thermochemistry. Electrons in atoms. The periodic table and some atomic properties. Chemical bonding. Liquids, solids and intermolecular forces. Solutions and their physical properties.

CHEM 141 General Chemistry Lab. I (0+2) 1 ECTS: 2
Experiments are related to the topics covered by CHEM 121 Course.

ENG 101 Development of Reading and Writing Skills I (3+0) 3 ECTS: 3
The overall aim of this course is to develop freshman students' English academic reading and writing skills. The course also aims at equipping students with basic study skills they will need throughout their academic life. Students are encouraged to write and present what they read;

therefore, speaking skills are introduced and make the students use them while presenting a topic.

FE 105 Introduction to Food Engineering (2+0) 2 ECTS: 2

This course aims to introduce the food engineering profession, the curriculum of the food engineering program; the basic concepts used in food engineering and the Turkish food industry. Scope, definition of food engineering. Principles of biological and physical sciences related to the food system. Introduction to structure and properties of food materials, preservation and engineering aspect of food processing from harvest to packaging and distribution

GCC 101 Career Planning and Development (2+0) 2 ECTS: 2

IYTE Career, Leadership and Entrepreneurship Center (CLEC) provides the activities that support students' skills enhancement. It also follows the course's activities such as seminars, invitation of speakers, webinars, arrangements with guest lecturers and students' communities. The supportive activities of IYTE Career, Leadership and Entrepreneurship Center (CLEC) designed to present core methods and tools used in professional job applications. Also the activities are designed in a way to use these methods and tools in most effective way in career planning and development. By collaboration with IYTE Alumni Office and IYTE Alumni Association, graduates share their experiences and introduce different businesses to the students. The course is constructed over 3 modules. Module 1: Internal stakeholders; IYTE Career, Leadership and Entrepreneurship Center (CLEC), IYTE Alumni Office, course lecturer participations. Career center presents available supplementary activities for IYTE students' career planning and development. Module 2: Guest speakers; IYTE graduates, IYTE student communities, IYTE lecturers present career development opportunities present in IYTE campus. Module 3: Guest speakers and panels with external stakeholders; professionals from the public and private sector, academia, NGOs; sharing methods, tools and experiences about career planning and development.

MATH 142 Basic Calculus II (3+2) 4 ECTS: 5

L' Hospital's Rule. Improper Integrals; Tests for Convergence. Sequences and Infinite series; Tests for Convergence. Multivariable Functions and Their Derivative; Limits. Directional Derivative, Gradient Vector, Double Integral, Double Integral in Polar Coordinates.

PHYS 102 General Physics II (2+2) 3 ECTS: 6

Electric charge: Coulomb's law, Electric field and field lines. Gauss' law. electric potential and electric potential energy. Capacitors and dielectrics. Currents in materials. Direct current circuits. The effects of magnetic fields. The production and properties of magnetic fields: Ampere's law, Gauss' law for magnetism, and the Bio-Savart law. Faraday's law of induction. Magnetism and matter.

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PHYS 112 General Physics II (0+2) 1 ECTS: 2
Experiments complementary to the course material related to the topics discussed in PHYS 102 General Physics II lectures will be carried out in this laboratory section.

CHEM 122 General Chemistry II (3+0) 3 ECTS: 5
Chemical kinetics. Principles of chemical equilibrium. Acids and bases. Solubility and complex ion equilibria. Entropy and free energy. Electrochemistry. Nuclear chemistry. Main group elements I: metals, main group elements II: nonmetals. Complex i on and coordination compounds. Transition metals.

CHEM 142 General Chemistry Lab. II (0+2) 1 ECTS: 2
Experiments are related to the topics covered by CHEM 122 Course.

ENG 102 Development of Reading and Writing Skills II (3+0) 3 ECTS: 3
The overall aim of this course is to develop freshman students' English academic writing skills, evaluating original articles and to make them able to write an original article about their own opinions on that topic. Students are encouraged to present what they have written.

FE 104 Fundamentals of Nutrition (3+0) 3 ECTS: 4
This introductory course provides basic information of nutrients including food sources, function of nutrients, digestion, and absorption, effects of deficiency and upper levels of nutrients, nutrient requirements for the life cycle, nutrient-nutrient interactions in human physiology, food origins and form, consumer behavior and clinical nutrition.

MATH 255 Differential Equations (4+0) 4 ECTS: 6
First order equations and various applications. Second order linear equations. Higher order linear differential equations. Power series solutions: ordinary and regular singular points. The Laplace transform: solution of initial value problems. Systems of linear differential equations: solutions by operator method, by Laplace transform. Fourier series and boundary value problems.

CHEM 221 Organic Chemistry (4+0) 4 ECTS: 5
Carbon compounds and chemical bonds, alkenes, cycloalkanes, alkanes, alcohols, ethers, radical reactions, aromatic compounds, conformational analysis, stereo chemistry, nucleophilic substitution.

CHEM 201 Analytical Chemistry I (3+0) 3 ECTS: 5
Fundamental theories and principles of quantitative methods of analysis. errors in chemical analysis and statistical treatment of analytical data. Gravimetric methods of analysis. Titrimetric methods of analysis. Aqueous-solution chemistry and effect of electrolytes on ionic equilibria.

An introduction to electrochemistry. Theory of neutralization, precipitation, complex-formation, and oxidation/reduction titrations.

FE 201 Material and Energy Balances in Engineering (3+0) 3 ECTS: 5

Units and dimensions, conversion of units, steady state-unsteady state processes, flow diagrams, material balances and calculations, behaviors of gas and vapor systems, types of energy, energy balances and calculations, psychrometric charts, humidification and cooling processes.

FE 211 Basic Programming for Engineers (2+2) 3 ECTS: 5

Hardware-software concepts and interactions; Industry 4.0, Internet of Things (IoT) concepts; Microsoft office applications for efficient report writing and presentation; Software for accessing and archiving literature; Introduction to R programming; Introduction to MATLAB; Mathematical operations and variable assignment in MATLAB; Matrix operations; Use of built-in functions; Plotting; User-defined functions; Script and function M-files; Structural programming with MATLAB.

TURK 201 Turkish Language I (2+0) 0 ECTS: 2

The course is organized to make students understand the structure and principles of contemporary Turkish language with living examples and to increase their interest in Turkish literature. Development of the students' writing and fluent speaking capabilities, increasing their vocabularies, improving their capacity to criticize, to comment, to create and development of their ability to gain habit of positive thinking.

HIST 201 Principles of Atatürk I (2+0) 0 ECTS: 2

Discusses the modernization of the Ottoman Empire during the nineteenth and early twentieth centuries, the spread of nationalism among its subject peoples, and the revolutionary changes in Ottoman institutions and society that led to the Empire's demise and the transitional period from the Empire to the national state and the foundation of the Turkish Republic following the national struggle led by Mustafa Kemal Atatürk.

FE 202 Fluid Mechanics (3+0) 3 ECTS: 5

Fluid statistics, fluid dynamics, viscosity and boundary layer theory. Newtonian and non-Newtonian fluid behavior. Application of equation of continuity and equation of motion to fluid flow systems. Exact solutions of the Navier-Stokes equations. Mechanical energy balances. Bernoulli equation. dimensional analysis and dynamic similarity.

FE 206 Food Microbiology (3+2) 4 ECTS: 5

Importance of microorganisms in foods. Intrinsic and extrinsic factors in foods affecting microbial growth. Indicator microorganisms. Contamination and spoilage of different foods. Chemical changes in foods caused by microorganisms. Microbial metabolism, microflora of

food commodities with special emphasis on food spoilage and food safety. Beneficial microorganisms and their use in food industry. Food-borne pathogens and diseases. Microbial food poisoning, infection and intoxication. Indices of food sanitary quality and microbiological standards. Conventional and new microbial counting and detecting methods. Control of microbial growth in foods. Food preservation methods. Cleaning, disinfection and sanitation. GMP, GHP, SSOP and HACCP system.
Lab: Basic techniques for handling microorganisms in the laboratory. Laboratory experience on basic principles of microbiological analysis of foods. Methods for obtaining pure cultures, enumeration, detection and control of microorganisms in foods through case studies. Isolation identification and enumeration techniques of the main food-borne pathogenic and indicator microorganisms, and lactic acid bacteria. Genetic based rapid techniques in food microbiology. Assessment of food safety and quality by microbiological analysis.

TURK 202 Turkish Language II (2+0) 0 ECTS: 2
Grammatical and linguistic knowledge, poems, stories, novels and essays written by the Turkish and international writers who use the language most skillfully. Besides, some panels and conferences are held related to the books selected.

HIST 202 Principles of Atatürk II (2+0) 0 ECTS: 2
Discusses major events that had taken place from 1923 to 1950, the structuring of the Republic of Turkey and the political, social, economic, and cultural revolutions introduced by Mustafa Kemal Atatürk.

FE 210 Introduction to Statistics for Engineers (3+0) 3 ECTS: 5
Data collection, graphical and numerical descriptive statistics to summarize and present data, definition and laws of probability, basic probability distributions for discrete and continuous variables, random sampling and statistical inference, hypothesis testing and confidence intervals for analyzing means and variances, analysis of variance (ANOVA), linear regression.

ECON 205 Principles of Economics (3+0) 3 ECTS: 4
Definition of economics, general view of price system, market and price, macroeconomics, definition of GNP. Fiscal and monetary policy, international trade. Development and growth.

FE 301 Heat Transfer (3+0) 3 ECTS: 5
Steady and unsteady heat conduction. Convective heat transfer: governing equations; dimensionless parameters; analogy between momentum and heat transfer. Design correlations for forced, natural, and mixed convection. Heat exchangers. Radiative heat transfer.

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FE 303 Thermodynamics (3+0) 3 ECTS: 5

Fundamentals of thermodynamics; Properties of pure substances; Heat and work concepts; First Law of thermodynamics in open and closed systems; Second Law of thermodynamics in open and closed systems; Entropy; Power cycles and refrigeration; Thermodynamic properties of real substances

FE 305 Food Chemistry (3+0) 3 ECTS: 5

Structure and properties of food components (water, carbohydrates, proteins, lipids, others). Chemical and biochemical reactions of food constituents in fresh and processed foods. The chemistry and biochemistry of changes occurring during processing and storage of foods. Functional properties of food components.

FE 321 Food Chemistry Laboratory (0+2) 1 ECTS: 2

Basis of chemical methods used in quantitative and qualitative determination of moisture, carbohydrates, proteins, lipids, enzymes and coloring and flavoring compounds of foods.

ENG 301 Technical Writing and Communication (3+0) 3 ECTS: 3

Methods of library research. Principles of clear writing related to technical style; problems such as technical description and technical correspondence. Techniques for the preparation of research papers, reports and term papers. A discussion of the basics of scientific writing style and composition. Principles and procedure of technical writing; attention to analyzing audience and purpose, organizing information, designing graphic aids, and writing such specialized forms as abstracts, instructions, and proposals. Application of these principles to writing research papers and review articles, grant proposals, research statements and to preparing academic oral and poster presentations. Developing oral communication skills by using rhetorical strategies such as narration and argument; communication practices on selected topics, preparing oral reports; drafting, revising, editing; evaluation and proper documentation of source material.

FE 302 Mass Transfer (3+0) 3 ECTS: 5

Fick’s Law of molecular diffusion; Diffusion in gases, liquids and solids; Diffusion with homogeneous and heterogeneous reaction; Equation of continuity for a Binary Mixture; Convective mass transfer; Models to predict mass transfer coefficients; Analogy between momentum, heat and mass transfer; Unsteady state mass transfer; Phase equilibria; Mass transfer between phases; Overall mass transfer coefficients; Absorption; Distillation; Extraction; Leaching; Drying; Membrane separations.

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Courses for Students Enrolled in the 2025-2026 Academic Year

FE 304 Food Engineering Unit Operations (3+0) 3 ECTS: 5
Unit Operations in Food Processing e.g., thermal processing (pasteurization, sterilization), dehydration, freezing, evaporation, physical separation, complementary unit operations such as mixing, comminution etc.

FE 310 Food Technology (3+0) 3 ECTS: 4
This course is related to technologies applied during preparation, transportation, storage and processing of food. The course focuses on principles of major technologies including packaging, cold storage, freezing, drying and thermal processing. Moreover, the general technologies used during processing of fruits and vegetables, cereals, oils and meat and meat products are also summarized.

FE 322 Unit Operations Laboratory (0+4) 2 ECTS: 4
The unit operation experiments in food processing conducted with tubular heat exchanger, shell and tube heat exchanger, plate heat exchanger. Experiments for linear heat conduction, radial heat conduction, unsteady state, liquid diffusion, sieving, friction loss determination, viscosity.

FE 400 Summer Practice (0+0) 0 ECTS: 1
This is a practical training in an organization in which food engineering is extensively practiced. Students present a formal report describing the activities conducted during the training.

FE 401 Principles of Food Safety and Quality Assurance (3+2) 4 ECTS: 4
Principles of food safety; Causes and prevention of food spoilage; Theories and applications of quality assurance, functions of a quality assurance program; Regulatory and technical aspects of quality assurance and quality control in the food processing plants and quality assurance/control laboratories; Management of food safety and quality by industry, food quality systems including HACCP, safe food handling, total quality management, ISO quality standards, food safety systems in the food processing plants.

FE 403 Food Process Design (2+4) 4 ECTS: 8
This course is formed of a series of lectures on introduction of concepts related to design of a food process; application of mass and energy balances in process design; selection of equipment and materials and determination of the cost; protection of health and environment. It aims develop skills to apply the achievements that the students attained in the program to theoretical food process design using a holistic approach; to work in teams; to communicate through written reports and verbal presentations. Students are required to use resources to acquire the information and data necessary to successfully complete their food process design project assignment.
Prerequisites: FE 201, FE 202, FE 301, FE 302, FE 304, FE 322

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FE 423 Food Bioprocess Kinetics and Engineering (3+0) 3 ECTS: 5

This course will help students to understand bioprocesses for large scale production of biological product such as living cells or subcomponent of cells, for the optimization of yield and quality in the end product; in relation to food industries. Subjects include various spectrums like designing of bioreactors, study of fermenters (mode of operations etc.); this leads to the coverage of reactor configurations, oxygen transfer and scale up. The course topic switches to product purification, first with a conceptual coverage of operations used in bioseparation, and then a more detailed analysis to provide a conceptual understanding of chromatography, the modern workhorse of bioseparation. The course also includes the topics related some of the reactions e.g. enzymatic, chemical, physical and microbial in foods occur simultaneously during food processing and later in storage. Therefore, engineering students are eased into biochemical reactions, kinetic solutions and modelling. The course is also useful for the nutritionist, to be able to study the kinetics of changes during absorption and digestion of food or nutrients by the body (bioavailability).

FE 414 Process Control (3+0) 3 ECTS: 4

The course is designed to develop an understanding of the fundamentals of dynamic modeling, design and analysis of classical feedback control of chemical processes. Dynamic modeling; Input and outputs; State variables; Laplace transforms; Transfer functions; Stability; Feedback controllers and closed-loop systems.

MAN 211 Corporate Communication and Management Skills for Engineers (3+0) 0 ECTS: 3

Recruitment process, organizational structure and culture, developing communication and management skills, customer relations management and ethical issues in a global world and growing economies.

FE 408 Production Engineering for Functional Foods (3+2) 4 ECTS: 8

The main objective of the course is to impart knowledge and skills needed to formulate functional foods which have a positive health impact beyond basic nutrition, and design scalable processes to manufacture such food products in a sustainable manner. This course will help students to understand the multi-disciplinary nature of this commercially important sector of food industry subject combines food bioscience/technology/engineering, with subjects such as nutrigenomics, molecular biology, epidemiology, etc. for discovering bioactive food components and determining their efficacy; in order to solve problems on the basic principles of metabolism, and modelling the flow and transformations occurring in the gastro intestinal tract from an engineering perspective.

Prerequisite: FE 403

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TECHNICAL ELECTIVE COURSES

FE 204 Numerical Methods in Engineering (3+0) 3 ECTS: 7
Introduction to numerical methods; Matrix operations; Roots of equations; Optimization; Solutions of linear and nonlinear algebraic equations; Linear and nonlinear regression; Interpolation and extrapolation; Numerical differentiation and integration; Numerical solutions of ordinary differential equations.

FE 311 Principles of Food Packaging (3+0) 3 ECTS: 7
This course focuses on the functions of the food packaging. Other issues discussed are physical, chemical and barrier properties of packaging materials, applications of various materials used in the packaging of foods and specific packaging requirements for different food products.

FE 312 Introduction to Industrial Microbiology (3+0) 3 ECTS: 7
This course deals with microbial cell structure and function, microbial growth and metabolism, industrial microorganisms, fermentation media, fermentation systems, downstream processing, product development, regulation and safety, industrial processes and products.

FE 313 Food Additives (3+0) 3 ECTS: 7
The course discusses the functions of food additives and principles using food additives in different foods. The regulations and practices of using food additives in Turkey and in other countries, the contributions and the limitations of food additives in a food supply, and the methods used for evaluating the safety of food additives are other issues discussed in the course.

FE 314 Food Enzymes (3+0) 3 ECTS: 7
The course discusses the general structure, conformation and catalytic properties of enzymes, principles of enzyme kinetics, enzyme activation and inactivation methods, major food enzymes related to quality and roles of enzymes in nutrition.

FE 318 Introduction to Food Biotechnology (3+0) 3 ECTS: 7
The general topics of this course include definition of food biotechnology, principles of food processing and preservation using bio-based methods, treatment of agricultural and agro-industrial wastes, food fermentations (production of nutrients, fermented food stuffs, processing aids, flavors, functional food ingredients etc.), culture collections, enzyme fermentation technology and immobilized enzymes, application of enzymes in food industry. The GMO and international trade, patent rights, national and international regulations are also discussed as separate topics.

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FE 320 Sensory Analysis in Foods (3+0) 3 ECTS: 7

This course discusses the anatomy and physiology of the sensory systems, physiological and psychological factors that affect performance on sensory tests, basic scaling procedures, thresholds, selection of panelists, basic discrimination/difference tests, descriptive tests, and consumer tests. Detection of sensorial properties of foods using instrumental methods and correlation with sensory analysis, data analysis and interpretation of results and design of sensory panel rooms are other chapters.

FE 323 Applied Nutrition in Food Science (3+0) 3 ECTS: 7

This course will focus clinical approaches to determine importance of the nutrients in human health, introduction of in vivo, ex vivo, in vitro study models that can be applied in food science, determination of nutrients and functional molecules bioaccessibility in foods, showing of steps in cell culture studies, modeling of human intestine system in in vitro and using of this model in bioavailability studies.

FE 324 Nutritional Biochemistry (3+0) 3 ECTS: 7

After we consume nutrients from diet, they are used for energy source in cells of body. Energy is necessity to survive for living organism. This course will cover the macronutrients including carbohydrates, lipids, protein, fiber and alcohol. The course will also addresses energy metabolism. It will discuss the structure and function of the macronutrients and fiber; the digestion, absorption and metabolism of macronutrients, fiber, and alcohol. Utilization of the major nutrients emphasizing regulatory mechanisms at organ and cellular levels under various physiological conditions also will be discussed in this course.

FE 402 Nutrition in Health and Diseases (3+0) 3 ECTS: 7

This course focuses mainly on relation of modern diseases such as coronary heart disease, stroke, atherosclerosis, Type 2 diabetes, obesity, hypertension and cancer with diet; diseases and nutrition support; healthy eating, sustainable nutrition; recommended and non-recommended food and their health effects; nutrition through the life cycle; developing strategies in preventing or slowing diseases and bioactive compounds in food and their health benefits.

FE 405 Microbiological Quality Control (2+2) 3 ECTS: 7

This course discusses mainly the foodborne microbial diseases, food spoilage and its control and microbiological quality control in food chain. The sampling and sampling plans, preparation of food homogenates and microbiological analysis are also discussed with details. Other topics include microbiological standards and methods used in the microbiological quality control of foods, and application of microbiological quality control in food products.
Prerequisite: FE 206

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FE 406 Principles of Food Preservation (3+0) 3 ECTS: 7

This course is an introduction to food preservation methods. General methods for short and long term preservation are discussed with particular emphasis on thermal processing, refrigeration, freezing, concentration, drying, fermentation and irradiation. The effects of different preservation methods on physical, chemical and organoleptic changes of food products as well as roles of food packaging in the preservation of food products will also be discussed with details. Novel emerging technologies including pulsed electrical fields, pulsed light, high pressure processing, microwave and radio frequency, ohmic heating, and ultrasound will also be introduced and research needs in these processing technologies will be emphasized.

FE 407 Engineering Properties of Foods (3+0) 3 ECTS: 7

Relationships between composition, structure and physical properties of foods. Measurement methods and the use of physical, mechanical, rheological, thermal, electromagnetic, surface and interface properties in the design of new applications and product development.

FE 409 Methods in Nutritional Sciences (3+0) 3 ECTS: 7

This course is related to principles of in-vivo and in-vitro analytic, biochemical and molecular methods as well as biostatistical methods used in nutritional research studies. The preparation of biological materials for analysis, methods for adsorption, digestion and metabolism of nutrients, test of health benefits of food (antioxidant, antihypertensive and antidiabetic activity, anticancerogenic activity etc.) with chemical, enzymatic and cell culture methods, and nutrient, metabolite, and enzyme analysis in body fluids are the major topics discussed in this course.

FE 410 Introduction to Nutrigenomics and Nutrigenetics (3+0) 3 ECTS: 7

The content of this course includes classical and recently discovered examples to understand interaction of diet and nutraceuticals with genes and health, possibility of modifying disease risks through nutrigenetics and nutrigenomics, personalized nutrition, application of nutrigenomics in product development, and major technologies used in nutrigenomics and nutrigenetics.

FE 411 Research/Problems in Nutrition (3+0) 3 ECTS: 7

This course focuses on understanding current nutrition strategies, emerging issues and research in nutrition and global nutrition problems, and helps students to develop novel approaches to use science and technology in solution of nutrition problems. The course encourages students to follow very recent developments in nutrition, discover scientific and technological solutions for nutritional problems and make interactive discussions in class with other students and tutor.

FE 412 Introduction to Nutritional Epidemiology (3+0) 3 ECTS: 7

This course focuses on monitoring the nutritional status of populations and developing healthful eating patterns among populations. The content of the course includes the principles of

nutritional epidemiology, design, planning and evaluation of nutritional epidemiology studies, principles of sampling, determining study size and power of epidemiological study, covariate measurement errors in nutritional epidemiology and measurement of exposure and outcome by considering consumption tables, nature of variation in diet, food frequency methods, biochemical markers of food intake and gene-nutrient interactions.

FE 413 Quality Management Systems (3+0) 3 ECTS: 7

Quality concept and related definitions; national and international standards and legislation concerning food quality; quality assurance systems and total quality management in food industries; quality management tools; quality criteria, their respective limits and quality monitoring systems for different food commodity groups; relevant ethical issues.

FE 417 Special Topics in Nutrition and Food Engineering (3+0) 3 ECTS: 7

This is a flexible course which discusses the emerging problems, technologies and methods in food engineering and nutrition. The course aims improving the knowledge of students about the latest topics in the specified fields and increases their vision beyond the classical knowledge.

FE 418 Introduction to R Programming (3+0) 3 ECTS: 7

This is an introductory course to the widely used analysis and scripting platform called R by scientists and engineers. The course will cover the basic programming methods and packages, data manipulation, analysis, graphing, and statistical analyses in the R environment.

FE 419 Instrumental Analysis in Foods and Nutrition (2+2) 3 ECTS: 7

Sample preparation methods for food analyses. Theoretical principles and applications of spectroscopic and chromatographic techniques used in food analyses. Introduction of techniques that are used to investigate effects of nutrients on human physiology.

FE 420 Graduation Project (0+6) 3 ECTS: 7

The project may be computer aided design or laboratory work based on theoretical or experimental study on Food Engineering. Lecture will be conducted by the related instructor for one semester.

FE 424 Sustainable Food Processing (3+0) 3 ECTS: 7

The objectives of the course are to learn the principles of sustainability, to have knowledge of how sustainability concepts are applied in various food processing sectors, to learn about sustainable complementary unit operations (packaging, storage, cleaning, sanitation, cooling, waste treatment, etc.) used in the food industry, to understand the concept of national and international food distribution and the need for sustainable food supply networks, to evaluate the issues of ensuring food safety and sustainability in food consumption. The course includes key concepts in sustainable food systems, life cycle assessment (LCA), environmental impact

assessment (EIA), sustainable food processing and examples, food supply chain and waste management, energy consumption and reduction strategies in food processing, and sustainable global food supply networks.

FE 425 Supplementary Curricular Courses (3+0) 3 ECTS: 7

Within the scope of the course, starting from the 3rd semester, students can apply for the activities that include an evaluation process to be substituted as “Education Plan Support Course”, provided that they register and successfully complete the “Education Plan Supporting Events” determined by their departments throughout their undergraduate education. It is obligatory to submit information and documents regarding the content, duration, date and success criteria of the “Education Plan Supporting Event” for substitution.

FE 499 Cooperative Education Course (0+6) 3 ECTS: 7

Food Engineering undergraduate students will have opportunity to apply the knowledge and skills acquired from their course work. Students will be able to collate all theoretical and practical knowledge they learned from the courses taken during their education and learn synthesizing and inclusion into the industrial R&D, quality and production processes. The main goal of this course is to help students in their career development, to improve written and spoken communication skills using the experience and skills acquired in a professional environment.