

**GIRESUN UNIVERITY**  
**ŞEBİNKARAHİSAR SCHOOL OF APLIED SCIENCES**  
**FOOD TECHNOLOGY DEPARTMENT**  
**COURSE CONTENTS**  
**2019-2020**

**I. TERM**

**T-A-C**

**TDB 101 TURKISH LANGUAGE I**

**2-0-2**

The definition of language, its importance and place as a social institution in national life, relationships between language-culture, its place among the world languages, the development Turkish language and its historical periods, the current state of the Turkish language and areas where it has spread, the rules of Turkish language phonetic features, the sound events in Turkish, orthography and its applications, punctuation and its applications, and the structural properties of Turkish.

**AITB 103 PRINCIPLES OF ATATURK AND HISTORY OF TURKISH REVOLUTION I**

**2-0-2**

Concepts and Objectives; European Developments; Constitutionalism and Opposition in Ottoman Political Life; 2. Constitutional Monarchy Period; World War I and the Ottoman Empire; National Struggle-Preparatory Period; Transition of Mustafa Kemal Pasha to Anatolia and Congresses; Opening of the Turkish Grand National Assembly and the Emergence of the New Turkish State; Mudanya Armistice and Lausanne Treaty; Foreign Policy of National Struggle.

**ENF 105 BASIC COMPUTER I**

**2-1-2**

Computer identification, description of computer logic, computer components, listing, description and functions of computer hardware devices, Internet searching, mailing the attached file, theses, and articles in the search, using online databases, word editing program, paragraphs, and image properties Adding an image editing, adding tables properties, and table editing, page editing features, sub-information / Add information to the top of the cutting insert, set the properties of PowerPoint presentation preparation and presentation.

**YDB 107 FOREIGN LANGUAGE I**

**2-2-3**

Present Tense of be, Possessive's-Cardinal Numbers, Imperative Sentences-Demonstratives, Modal (can), Relative Pronouns and Prepositions, Have-has got, Countable and Uncountable Nouns: There is, there are, Present Continuous Tense, Simple Present Tense.

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**MAT 118 MATHEMATIC I**

**2-0-2**

Numbers, exponential and radical numbers, modular arithmetic, decimal numbers, algebra and polynomials, ratio and proportion, equations, inequalities, functions, trigonometry, vectors and matrices.

**GT 103 GENERAL CHEMISTRY**

**4-0-5**

Articles and Features, substances separation (separation of mixtures of the compounds, separation), elements and compounds (elements and compounds, atomic model), structure of matter (classification of elements, ions, Bonds, Compounds, Atoms, Molecules), acids and bases (General characteristics, valences, forces, acid-base titrations and neutralization), equilibrium solubility and solutions, chemical Reactions (Physical and chemical changes, chemical reactions, equations), chemical calculations.

**GT 109 GENERAL MICROBIOLOGY I**

**3-0-5**

Course content and sections of the microbiology, classification and naming of organisms, groups of microorganisms, microbial nutrition and control of micro-organisms are on the agenda. In addition, the use of the microscope laboratory applications, such as media preparation, and basic information is given to inoculation.

**GT 101 INTRODUCTION TO FOOD TECHNOLOGY**

**3-0-5**

The history and the definition of food technology, changing eating habits, food technology, methods of food preservation, food preservation methods of technological developments, lyophilization, canning, dairy technology, cereal, technology, food preservation by freezing, storing spices, meat technology, fruit and vegetable processing technology, storing sugar, vinegar technology, acid storage, oil technology, technological aspects of the radiation process, and functional foods are included.

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**ELECTIVE I**

**GT 117 TRADITIONAL FOODS**

**2-0-2**

The aim of the course is to teach the Turkish nutrition culture and to give detailed information about our traditional foods. In this course, adequate and balanced nutrition rules, Turkish nutrition culture, production methods of our traditional products, developments on industrial scale production of traditional foods, applications of quality assurance systems in traditional food production are taught.

**TCE SOCIAL GENDER EQUALITY**

**2-0-2**

The concept of gender, how the society sees it, the principle of gender equality and the basic elements on which it is based.

**GT 134 MEASUREMENT METHODS**

**2-0-2**

To students; the course aims to give information about basic measurement knowledge, methods used in measurement, measurement units, measuring instruments, devices, measurement applications that they can benefit from in their professional life in the future.

**II. TERM**

**T-A-C**

**TDB 102 TURKISH LANGUAGE II**

**2-0-2**

Punctuation, Spelling Rules, Composition Information: Art of Composition, Types of Written Expression, Types of Oral Expression, Preparation of Scientific Writing.

**AITB 192 PRINCIPLES OF ATATURK AND HISTORY OF TURKISH REVOLUTION II**

**2-0-2**

Political reforms: Abolition of the sultanate, declaration of the republic, abolition of the caliphate represented in the parliament in the era of Atatürk founded the political sects and political events, republican law revolution and educational reforms, the reforms in the field of culture and education, Turkish foreign policy in the era of Atatürk, Atatürk's principles, Turkey after Atatürk

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**ENF 146 BASIC COMPUTER II**

**2-1-3**

Create text using word processing programs, formatting, tables, templates, and outline the use of the account with the account functions of spreadsheet programs, graphics and multi-file usage.

**YDB 116 FOREIGN LANGUAGE II**

**2-2-3**

Simple Past, Have to, Comparative and Superlative Adjectives, Future Tense (going to), To (infinitive of purpose), Descriptions, Shall-will (offers), Future Tense: To be going to, Will, Present Perfect Simple.

**GT 102 GENERAL MICROBIOLOGY II**

**3-0-5**

Course content and sections of the microbiology, classification and naming of organisms, groups of microorganisms, microbial nutrition and control of micro-organisms are on the agenda. In addition, the use of the microscope laboratory applications, such as media preparation, and basic information is given to inoculation.

**GT 104 ORGANIC CHEMISTRY**

**3-0-6**

Introduction to organic chemistry, functional groups and general classification of organic compounds, hydrocarbons (alkanes, alkenes, alkynes), cyclic aliphatic hydrocarbons, aromatic hydrocarbons, alkyl halides, alcohols and ethers, aldehydes and ketones, carboxylic acids and esters, amines, amino acids, proteins and lipids.

**GT 108 ORGANIC FOOD AND AGRICULTURE**

**2-0-3**

Ecological farming places and products, ecological crop production rules, ecological animal production rules, the rules to be followed in storage and processing of ecological products, control and certification system in ecological products, control process and labeling, fertilization and soil improvement products allowed use in ecological products processing and materials that can be used in preparation, organic plant and animal breeding.

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**MAT 119 MATHEMATIC II**

**2-0-2**

Definition of complex numbers, vector representation, four operations of complex numbers in Cartesian form, polar and Cartesian transformations of complex numbers, professional use of complex numbers, properties and operations of exponential functions, definition of logarithm function and logarithm taking methods, use of logarithm function in professional field, derivative definition and derivation methods, application of derivative on functions, use of derivative in professional field, definition of integral and integration methods, application of integral on functions and use of integral in professional field

**GT 114 BASIC PROCESSES IN FOOD**

**3-0-2**

Dimensions, Measuring Systems and Units; Thermodynamics, Laws of Thermodynamics, Heat Machine, Carnot Principle and Carnot Heat Engine, Entropy; Heat transfer; Fluid Mechanics, Flow Phenomenon, Flow Types and Reynolds Number, Bernoulli Principle, Viscosity; Mass and Energy Balances; Phase Graph of Water, Water Activity and Sorption Isotherms; Gas Laws, Ideal Gas Equation, Psychrometry, Evaporation and Distillation, Sedimentation, Centrifugation and Filtration, Heat Treatments.

**ELECTIVE II**

**GT 120 FOOD INDUSTRY AND ENVIRONMENT**

**2-0-2**

Definition of ecology and its relationship with food, vital cycle, damages and benefits of industrial wastes to ecology, the residuals and contaminants pass to food from environment .

**GT 124 FOOD BIOLOGY**

**2-0-2**

The subject and sections of biology, organisms and environment, cell science, tissues, organs and systems, reproduction, reproductive system, feeding and digestive system in living organisms, circulatory, excretion, nervous, respiratory systems, nucleic acids, hormones and endocrine system, enzymes, microorganisms Factors affecting growth in plants before harvest, physiology of milk formation and breast anatomy, factors affecting meat and carcass quality.

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**III. TERM**

**T-A-C**

**GT 201 ANALYTICAL CHEMISTRY**

**4-0-4**

Introduction to analytical chemistry, gravimetric methods, volumetric methods (important concepts in volumetric analysis, volumetric calculations, normality and equivalent weight), chemistry of aqueous solutions (composition of aqueous solutions, chemical equilibrium), calculation of pH of aqueous solutions (acid, base, salt and buffer) calculation of pH of solutions, calculation of pH of polyacids), Solubility multiplication (K<sub>çç</sub>) expression, calculation of pH of mixtures.

**GT 203 FOOD MICROBIOLOGY I**

**2-2-5**

Microorganisms and foods, Sources of contamination of food, Factors affecting the reproduction of microorganisms in food (internal factors, external factors), Food preservation methods (prevention of contamination, removal of contaminants from food, prevention of microbial reproduction, fermentation of microorganisms in foods Indicator microorganisms in foods.

**GT 2019 FOOD ANALYSIS I**

**2-2-4**

Laboratory rules, working conditions and cautions, functions of laboratory materials and devices of the laboratory, preparing solution, technics of sampling, preparing samples for analysis, moisture content of foods, protein analysis in foods, carbohydrates and lipid analysis in foods, ash, total mineral analysis, measuring pH and determination of total acidity of Food, vitamin, cholesterol, food additives and residue analyzes in foods, general food analysis methods and quality controls, determination of brix value of honey and other sugary samples

**GT 2015 FOOD CHEMISTRY I**

**3-0-4**

Introduction to food chemistry, chemical structure of carbohydrates, general properties of monosaccharides and disaccharides, polysaccharides and general properties, heteropolysaccharides and their use in food industry, lipids and general properties, classification of triglycerides, saturated and unsaturated fatty acids and isomerism in fatty acids, hydrolytic and oxidative degradations, and some functions of fats, fat-like substances, phosphatides, sterols, lipochromes and their general properties, proteins and their general

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properties, chemical properties of amino acids, aromatic and heterocyclic amino acids, isoelectric point in amino acids, conformation of protein molecules, hydrolysis and solubility of proteins in foods, presence of water and water as a solvent and swelling material, hardness of water, drinking water, properties of drinking water and cleaning of drinking water, presence of mineral substances in foods chemical structure and features.

**YDB 217 FOREIGN LANGUAGE III**

**2-2-3**

Questions, Tense revision, Right word, wrong word, Social expressions, Present Tenses, have/have got, Past Simple and Continuous, Adverbs, Expressing quantity, something/no one, Articles, Verb Patterns, Future Forms, Phrasal Verbs, What.....like, Comparatives and Superlatives, Synonyms and Antonyms.

**GT 213 FOOD ADDITIVES**

**2-2-5**

Definition of food additives, classification, preservation laws and organizations, Turkish-Food additives regulation, antimicrobial additives, antioxidants, color substances, taste-odor agents, calorie-free and low-calorie sweeteners, stabilizers, emulsifiers, phosphates used in food processing, acids and bases, anti-caking agents, clarifiers, bleaches, ashes and propellants, natural toxic substances in foods, optional additives and contaminants in foods.

**ELECTIVE III**

**GT 221 FUNCTIONAL FOODS**

**3-0-5**

Definition and history of functional foods, functional nutrient components, functional dairy products (probiotics, prebiotics, yogurt, kefir, koumiss etc.), functional bee products (honey, royal jelly, pollen, propolis), functional properties of fats and unsaturated fatty acids, dietary fibers , tocopherols and antioxidants, phenolic compounds, functional fruit and vegetable products, medical plants and herbs.

**RS 214 ADVERTISING AND ADVERTISING STRATEGIES**

**3-0-5**

The most important stage of the creative process in advertising is strategic planning. The final stage of the plan is the medium where the advertisement will be published. No matter how creative the advertisement is, it does not reach the consumer if it does not take place in the

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right medium with the right strategy. For this reason, it is necessary to know the unwritten rules of each advertising medium from television to poster, from radio to brochure. The aim of this course is to teach students these "secret" rules. To show practical tricks of being creative in the medium for the advertisements reaching its target.

**IV. TERM**

**T-A-C**

**GT 222 TOXICOLOGY**

**2-0-4**

Toxicology concept, dose definition and importance, organs in the human body and the importance of nutrition, poisoning. Natural toxic substances in foods, optional additives and contaminants in foods. Some definitions and limitations in Turkish food codex.

**GT 230 FOOD ANALYSIS II**

**2-2-3**

Acidity in raw milk, pH, Antibiotic Mastitis tests, Peroxide in raw milk, Phosphotase, Formaldehyde, Carbonate tests, Calculation of yeast strength in milk, Cheese and yogurt production, Starch in yogurt, gelatin detection, Boiling adequacy test in fruits, Antioxidant test in fruits, Refractive index, Briks, Determination of color, Water analysis, Jam and clear fruit juice production, odor, color, foreign matter, grain size tests in grains, Hectoliters in grains, Bintane, Grain hardness tests, Wet Gluten in Flours, Dry Gluten, Zeleny Sedimentation in Flours, Bread production and analyses. Honey and molasses analysis with spectrophotometer. Analysis of sugar by polarimeter.

**GT 226 FOOD PACKAGING AND STORAGE**

**3-0-3**

Basic functions of packaging, classification of packages, paper packages, metal based packages, glass packages, wooden packages, plastic based packaging materials, multi-layer combinations, effective factors in packaging selection. Methods and innovations used in storage.

**GT 228 NUTRITION**

**3-0-4**

Nutrition and health, nutrients that are essential in nutrition, their properties and uses in the body, the composition of different food groups, physical and chemical properties, different



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age, sex, work and special situation for individuals and groups to make appropriate nutrition plans.

**YDB 218 FOREIGN LANGUAGE IV** **2-2-3**

Present Perfect-for and since, ever and never, word formation, have to/don't have to, should/must, Past Perfect and narrative tenses, Passives, Compound nouns, Present Perfect Continuous, If+ will/might/would conditionals, Prepositions.

**GT 204 FOOD MICROBIOLOGY II** **2-2-5**

Contamination sources in foods, microbiologic spoilages at cereal and cereal products, microbiologic spoilages at sweet and sugary products, vegetables and fruits, microbiologic spoilages at meat and meat products, degradation reasons of canned food, contamination sources of milk and microbiologic spoilages, microbiologic spoilages at cheese, cream and butter, microbiologic contamination of yoghurt and ice-cream, starter cultures and kind of starter cultures, bacterial food poisoning, Staphylococcus aureus and Cl. botulinum poisoning, Salmonella and other bacteria poisoning, mycotoxin and mycotoxicosis, protect methods from food poisoning, microbiological consultation of meat and meat products, cereal products and canned microbiology, isolation and identification of microorganisms isolated from this food products.

**GT 220 FOOD CHEMISTRY II** **2-0-4**

Chemical structure and properties of vitamins, vitamins enrichment methods of foods, fat and water soluble vitamins, enzymes, the presence of enzymes in foods, chemical structures and properties, the use of enzyme preparations in the field of food production, general properties of alcohols and alcohol fermentation, food preservation methods, effective factors in food preservation, food classification of additives, food additives important in the food industry, identification of aroma substances, undesirable aromas and aroma values, aroma components, enzymatic and non-enzymatic browning reactions, naturally occurring toxic substances in foods, natural toxic substances of animal origin, natural toxic substances of animal origin , food contaminants, general properties, toxic components of microbial origin, pesticides, veterinary medicines and feed additives.

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**ELECTIVE IV**

**BAY 232 SCIENTIFIC RESEARCH METHODS**

**3-0-2**

Basic Principles of Scientific Research; Path to Scientific Research; Scientific Research Tools and Resources; Choosing the Appropriate Research Method; Data Collection Techniques and Data Analysis Methods. In this course, students will prepare projects on the subjects such as the application of knowledge, talent and creativity under the title of a market research, an experimental work in the laboratory or a research project in the form of an ongoing project, and present them with a final report and a mid-term seminar.

**GT 206 PROFESSIONAL ETHICS**

**3-0-2**

To examine the concepts of ethics and ethics, to examine the ethical systems and factors that play a role in the formation of ethics, to follow the principles of professional ethics, professional ethics and professional corruption, to examine the consequences of unethical behavior and social responsibility in professional life.

**GT 240 FOOD STORAGE TECHNIQUES**

**3-0-2**

The importance of food preservation. Sensory, chemical, biochemical and microbiological changes in foods. Factors affecting the changes in foods. Traditional methods and applications used in food preservation. New methods and applications in food preservation.

**V. TERM**

**T-A-C**

**GT 301 FISHERIES TECHNOLOGY**

**3-0-4**

Definition, physiological and chemical structure of seafood. Processing technologies and process flow charts of various seafood. Spoilage of seafood, identification and reasons of spoilage. Aquaculture, by-product technologies. Hygiene and sanitation in seafood industry. Demonstration of quality control methods in seafood. Evaluation of the analysis results. Application methods of food codex and standards in seafood.

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**GT 311 ENZYME AND BIOTECHNOLOGY**

**2-2-4**

Historical development of enzymes, importance of enzymes, application areas, degradation of enzymes in foods, important enzymes for food industry and their nomenclature, commercial enzyme production and purification of enzymes, properties and important functions of enzymes used in food technology.

Definition and importance of biotechnology; History; Types of genetic material; DNA and RNA structure; Some features of DNA (replication, repair and expression), enzymes in DNA replication; Transcription and control; Translation; Genetic code; Strain development methods in biotechnology; Mutations and mutagens; Genetic recombination in prokaryotes; Molecular cloning; Principles of microbial growth (in batch and continuous cultures); Properties and use of bioreactors.

**GT 305 MEAT SCIENCE AND TECHNOLOGY**

**2-1-4**

Importance of meat in terms of healthy and balanced nutrition, butchery animals, meat from butchery animals, meat ripening, storage, grading. Production of garlic sausage, salami-sausage-ham, bacon, roasting, smoked and canned meat products, additives used in the production of these products, intestines. Poultry and fish meats, their importance in terms of nutrition, some basic products and production technologies.

**MYD 313 PROFESSIONAL FOREIGN LANGUAGE**

**2-2-3**

Re-expression of sentences, contextual resources, expression of function and purpose, relative clauses, elements of technical writing, summarizing, paragraph analysis in technical writings, terms used in food chemistry, basic concepts used in food engineering, food processing terms.

**GT 309 FOOD MACHINES**

**3-0-3**

The aim of this course is to provide the students with the competence of raw material preparation machines, separation machines, mixing machines, heat treatment and equipment, size reduction machines, packaging and packaging systems. Food processing machines are discussed in detail.

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**GT 357 SPECIAL FOODS**

**2-0-4**

The establishment and development of the sugar industry in Turkey; Production of sugar and raw materials of sugar; Cocoa and Chocolate Technology: Cocoa, Cocoa powder and Cocoa butter, Chocolate, Chocolate types and chocolate making, Confectionery Technology: Candy types and properties (Marshmallow, Nougat, Starch and Pectin Gels, Hard Candies, Fudge, Caramel, Creams, Coating Sugars); Tea technology (Black tea, tea-bag and instant tea); Coffee Technology (Grinded coffee and instant coffee).

**GT 319 OCCUPATIONAL HEALTH AND SAFETY**

**2-0-2**

Occupational health and safety legislation, occupational health and safety legal basis, occupational health and safety in food sector, chemical substances and hazards, biological materials and hazards, precautions against occupational accidents in food sector in Turkey and in the world, current events and developments related to occupational health and safety.

**GT 327 FOOD BIOCHEMISTRY**

**3-0-3**

Introduction to biochemistry, structures in biological systems, structure and functions of biomolecules, cell, water and water activity, structure and functions of carbohydrates, structure and functions of proteins, structure and functions of nucleic acids, enzymes, vitamins, minerals and hormones.

**ELECTIVE V**

**AB 313 EUROPEAN UNION**

**2-0-3**

The role of the EU in international relations, the emergence of the EU as an important factor in world politics in the second half of the 20th century; different aspects of EU participation in world politics as a new political structure; EU's relations with the United States, China and Russia, EU relations with the Mediterranean countries, EU's neighborhood policy.

**GT 319 HUMAN PHYSIOLOGY**

**3-0-3**

The working mechanisms of the cells, tissues, organs and different systems that make up the human body are examined. Cells, tissues, organs and different mechanisms of human body are studied.

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**GT 335 ADVANCED LABORATORY APPLICATIONS**

**3-0-3**

Basic principles in providing a safe working environment, informing laboratory staff, classification of chemicals, labeling, storage and usage information, solution preparation techniques, information about chromatographic separation methods, determination of antioxidant and enzyme activities, application of some food analysis methods and giving information about food microbiological methods.

**VI. TERM**

**T-A-C**

**GT 312 FERMENTATION TECHNOLOGY**

**2-2-4**

In this course, fermentation product technologies such as pickles, olives, vinegar, wine, beer, boza, tarhana and turnip production are discussed in the scientific basis. In addition, production of organic acids, enzymes, amino acids and vitamins are discussed by using fermentation technology.

**GT 326 INDUSTRIAL FOOD PRODUCTION**

**3-0-4**

Planning of ready-made food production facilities, selection and placement of tools and materials to be used, preparation of menu, supply of raw materials suitable for menu, preparation, cooking, cooking methods and their effects on product quality, portioning, transfer, service, collection of dishes, cleaning and disinfection, pest control, food poisoning, quality control in bulk meal production.

**GT 316 FOOD QUALITY CONTROL AND LEGISLATION**

**3-0-4**

Definition of quality and historical development, quality system certificates (TS ISO EN 9001-2000, TS ISO 22000, TS ISO EN 14001, TS 18001), certification, quality-efficiency relationship, The law No.5179 in reference to “food production, consumption and inspection” and related regulations, Turkish Food Codex and annexes (product communiqués), expertise and other professional laws.

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**GT 318 BEVERAGE TECHNOLOGY** **2-2-5**

Fruit juice production, composition of fruit, composition of fruit juices, definition of fruits, factors related to factory establishment, preparation of fruits for processing, pre-pressing processes, pressing and pressing, thinning of pulp, fining and clarification, filtration, stabilization and storage of fruit juice beverages and production technology, CO<sub>2</sub> and its properties, preparation of syrup, essence types, gassing of beverages, defects in fizzy drinks and quality control. Beer, wine and similar alcoholic beverages and production technologies. Quality control in alcoholic beverages, packaging, storage and marketing.

**GT 320 INSTRUMENTAL ANALYSIS** **2-1-3**

Classification of chromatographic methods and general principles; High Pressure Liquid Chromatography (HPLC): instrumentation, columns, detectors, column separation methods, use of HPLC in food analysis; Gas Chromatography (GC): columns, detectors; Gas Chromatography (GC), Thin Layer Chromatography (TLC) and other chromatographic methods, Electrophoresis; Spectroscopy: interaction with electromagnetic waves and matter, atomic and molecular absorptions, Beer's Law, instrumentation of UV-visible spectrophotometer; Atomic Absorption Spectrophotometry (AAS) and other spectrophotometric methods.

**GT 324 MILK AND DAIRY PRODUCTS TECHNOLOGY** **2-2-5**

Production and trade of milk and dairy products in Turkey and in the world; definition of milk, composition of milk (lipids, proteins, carbohydrates, mineral substances, enzymes, etc.), the factors affecting milk composition, physicochemistry and technological importance of milk components, milk coagulation mechanisms; milk microbiology, sanitation in dairy farms and starter cultures used in dairy products; collection of raw milk. Pretreatments applied to raw milk (cleaning of milk, separation of milk fat, homogenization, bacto-fugation, deaeration), pasteurization, sterilization. Brief description of yoghurt, cheese, butter and ice cream production techniques. In addition, chemical analyzes of milk, are carried out in the laboratory.

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**GT 322 MODERN BIOTECHNOLOGY**

**2-1-3**

Definition and history of biotechnology, its connection with molecular biology, bioprocess and biotechnology, fermentation technology, enzyme engineering and technology, recombinant protein production, directed mutations, protein engineering, plant and animal cell tissue culture, vaccine and antibiotic production, genetically modified organisms and gene therapy.

**ELECTIVE VI**

**GT 330 VARIETY SCIENCE OF FRUIT AND VEGETABLES**

**3-0-2**

Definition of fruits and vegetables, giving some botanical definitions, systematic properties of fruits and vegetables, fruits eaten with leaves, fruits eaten with root and stem, fruit development physiology, the importance of hormones in fruit development physiology, seed development physiology, the importance of fruits and vegetables for health, antioxidants in vegetables and fruits, the importance of fruits and vegetables in food industry.

**GMB 324 MATERIAL KNOWLEDGE IN FOOD TECHNOLOGY**

**3-0-2**

The meaning of material knowledge and its importance in the production, basic principles of material knowledge. Classification of materials, properties of materials, structure of materials, alloys, iron-carbon alloys and heat treatments, iron and steel materials, steel production methods, non-ferrous metals, organic materials, polymer materials, properties and polymerization, ceramic and composite materials, corrosion of materials, amorphous materials and their properties, material tests and devices used in material tests.

**GT 336 ALCOHOLIC BEVERAGE TECHNOLOGY**

**3-0-2**

The course consists of two modules: fermented and distilled alcoholic beverages. Prior to these issues, water quality criteria and control techniques are mentioned. Fermentation processes used in beer and wine production are explained gradually. Distilled alcoholic beverages and production techniques are introduced.

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**VII. TERM**

**T-A-C**

**GT 481 GRADUATION PROJECT I**

**2-0-3**

Preparing and evaluating projects related to the special fields of food science and technologies (Each project is delivered to the department in writing.)

**GT 426 GRAIN TECHNOLOGY**

**2-1-5**

Definition of grain, the place of grain in economy and nutrition, physical structure of grain, chemical composition; water, carbohydrates, proteins, lipids, mineral substances, vitamins and enzymes. Grain storage, grain relations with atmospheric conditions, quality appraisal and standardization in wheat, introduction to flour milling, separation and cleaning machines, mechanism and methods of wheat annealing, grinding elements; roller mills, sieves, grinding control, quality and classification of flour passages.

**GT 413 FRUIT AND VEGETABLE PROCESSING TECHNOLOGY**

**2-2-4**

Some biological, physical and chemical properties of fruits and vegetables, Fruit juice, nectar and beverage production Technologies. Tomato processing and tomato paste production technology. Concentration of fruit and vegetable juices. Calculation of pasteurization and sterilization values in heat treatments. Production of canned products, Jam and marmalade production technology. Preservation by cooling and freezing technology. Fruits and vegetables drying technology.

**GT 403 SENSORY ANALYSIS**

**2-2-3**

Introduction to sensory analysis, organization and operation of sensory analysis program, scales used in sensory analysis, experimental design, difference tests, descriptive tests and consumer taste tests.

**GT 407 HYGIENE AND SANITATION**

**3-0-3**

Definition of hygiene and sanitation, importance in food industry, microorganisms and sanitation, microbial contamination in foods, other foreign substances in foods, detergents, cleaning, disinfection and disinfectants, personnel hygiene, instrument-equipment hygiene, air



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and water hygiene, business organization and hygiene, insect and rodents, pest control, sanitation waste and environmental issues, sanitation regulations.

**GT 424 MILK PROCESSING TECHNIQUES** **3-0-3**

Processing techniques in view of sensory and physical properties of milk. Unit operations in dairy products and auxiliary agents to dairy products such as enzymes and starter cultures. Potential problems during milk processing stages, solutions to them and the points to take into consideration. Enzyme and starter cultures for production of fermented dairy products.

**GT 411 FOOD BIOTECHNOLOGY** **3-0-3**

Introduction to biotechnology; Brief history of biotechnology, Types of biotechnology, Biological problems of our age, Biotechnology and labor, Microbial biotechnology, Fermentation biotechnology, Recombinant DNA technology, Enzyme technology and Plant biotechnology

**ELECTIVE VII**

**GT 401 CONSUMER BEHAVIOR** **2-0-3**

This course focuses on consumer behavior and its effects on businesses; importance of consumer behavior in marketing, customer satisfaction, constitution of customer loyalty; the phenomenon of consumption, needs and desires; concept and characteristics of consumer behavior; consumer behavior and marketing strategy; buying behavior and decisions of consumers; factors affecting consumers' buying behavior; purchasing decision process and consumers' buying habits.

**GT 453 COOLING TECHNIQUE AND STORAGE** **2-0-3**

Cooling methods, diagrams used in the cooling technique, capacity and power calculations of components in the cooling system, refrigerants, cooling devices and equipment, graded cooling systems, cooling load calculation, cooling, cold storage; freezing and freezing methods, principles and some physical principles of freezing. cooling and freezing diagrams, freezing time, freezing rate, equipment and capacity calculations used in freezing methods,

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cold storage of meat and meat products, cold storage of fruit and vegetables. Storage of fruits and vegetables in controlled atmosphere. Packaging and storage in modified atmosphere.

**İSG 421 LABOR AND SOCIAL SECURITY LAW** **2-0-3**

History of labor law, basic concepts of labor law, labor agreements, strike and lockout, labor contracts and legal aspects, termination of employment contracts, wage in case of dismissal, collective bargaining agreements. Occupational safety concepts, Occupational safety officers, Occupational accident, Occupational disease, Risks and hazards, Precautions and measures to be taken, Risk analysis and application, Legal obligations in Labor Law.

**GT 440 ENTREPRENEURSHIP** **2-0-3**

Business, Main entrepreneurial approaches, Types of entrepreneurship, Basic functions of entrepreneurship, Entrepreneurship aspiration / motivation, Business idea development, Business plan and elements, Entrepreneurship culture, Establishing and developing business, Local entrepreneurship and SMEs, International entrepreneurship, Entrepreneurship ethics.

**VIII. TERM** **T-A-C**

**GT 484 GRADUATION PROJECT II** **2-0-3**

The student can continue his / her study which he / she started in the first semester under the supervision of the instructor or work on a new topic.

**GT 412 OIL TECHNOLOGY** **2-2-4**

Oily raw materials, Storage of oil seeds and fruits, pretreatments (cleaning, crushing and separating, linting, grinding, roasting), Oil extraction by pressing, Solvent extraction, Refining (removal of sticky substances, deacidification, decolorization, deodorization, winterization). Quality control systems in refining process, oil modification techniques (hydrogenation, interesterification, fractionated crystallization). Margarine production technology. Olive oil production technology. Quality control methods in vegetable oils.

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**GT 472 PROCESSING TECHNOLOGY FOR BAKERY PRODUCTS** **2-0-4**

Raw materials in bakery and bakery products, unit operations in the production. Working principles of machinery and equipment in the process flow, Alternative bakery products.

**GT 405 SUGAR AND SUGARY PRODUCTS TECHNOLOGY** **2-0-4**

Processes during the production of sugary products and technological developments in this field. Definition of sugar and sugary products, Chemistry of sugar and sugary products, production stages, Cocoa and chocolate production technology, hard candy and marshmallow production technology, croquant confectionery production, molasses (pekmez) production technology. The technology of Turkish fairy floss candy and of chestnut candy. Honey and honey technology.

**GT 410 MEAT PRODUCTS AND TECHNOLOGY** **2-0-3**

Sausage and salami production in “further processed products I” module. Bacon, garlic sausage and sausage-like products production in “further processed products II” module. Canned meat products, roasting production, ham production, smoked tongue production and jelly tripe production in “further processed products III” module.

**GT 408 RECENT DEVELOPMENTS IN FOOD TECHNOLOGY** **2-0-3**

Current food processing technologies, pulsed electric field, high pressure, magnetic field, infrared, radio waves, ohmic heating, irradiation, ultraviolet light, ultrasound, non-thermal processes, extraction with supercritical fluids, microwave technology, determinant microbiology, electrolyzed water, ozone.

**GT 474 INDUSTRIAL FOOD WASTES** **2-0-3**

Important food industry wastes, evaluation of dairy processing wastes, evaluation of seafood processing wastes, evaluation of meat processing wastes, evaluation of oil processing wastes, evaluation of potato processing wastes, evaluation of processing wastes of fizzy drinks, evaluation of bakery products waste recycling, examples of current waste assessment, recycling of garbage, composting and biogas production.

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**ELECTIVE VIII**

**GT 428 MEDICAL AND AROMATIC PLANTS 3-0-3**

Basic concepts related to medical aromatic plants, definition and classification of medical and aromatic plants, history of medical and aromatic plants, the importance of medical and aromatic plants in Turkey and in the world, secondary products of medical and aromatic plants, distinguishing terpenes-phenolic compounds and nitrogenous compounds from each other, identification of medical and aromatic plants with economic value, the cultivation of medical and aromatic plants, processing of medical and aromatic plants, endemic medical and aromatic plants grown in Turkey, medical and aromatic plants used in food technology, biotechnological applications in medical and aromatic plants.

**GT 416 FOOD SAFETY 3-0-3**

This course includes the harmful effects of toxins or infections caused by processed food or unprocessed raw food during the food processing phase and prevention methods from those effects.

**GT 402 BUSINESS MANAGEMENT AND MARKETING 3-0-3**

Institutional Change, Learning and Communication / R & D and Innovation / Systems Approach / Factories in Business and Management / Basic Functions of Management / Decision Making in Management / Organizational Structures / Quality Related Concepts / Total Quality Management Principles / Quality and Productivity in Production / Production Systems / Factory Layout Planning / Factory Layout and Workflow Examples

**GT 425 BY-PRODUCTS IN FOOD 3-0-3**

Definitions, classification, structural properties and chemical composition of by-products of food industry. Sources, compositions and evaluations of by-products of cereals, meat, milk, fruit-vegetables, oil industry and sugar processing industries which are the main food industry branches