FIRAT UNIVERSITY

ELAZIG ORGANIZED INDUSTRIAL ZONE VOCATIONAL SCHOOL

DEPARTMENT OF CHEMICAL AND CHEMICAL PROCESSING TECHNOLOGY
CHEMICAL TECHNOLOGY PROGRAM

(2018-2019 Curriculum)

COURSE PROGRAM

1ST CLASS 1ST SEMESTER (FALL SEMESTER)

COURSE CODE	COURSE NAME	T	P	Cr	C/E	ECTS
FİZ107	PHYSICS	3	0	3	C	3
MAT101	MATHEMATICS-I	3	0	3	C	4
TRD109	TURKISH LANGUAGE-I	2	0	2	C	2
YDİ107	ENGLISH-I	2	0	2	C	2
OKT161	GENERAL CHEMISTRY-I	4	0	4	C	5
OKT163	GENERAL CHEMISTRY LABORATORY	0	2	1	C	2
OKT165	ANALYTICAL CHEMISTRY	4	0	4	C	5
OKT167	INORGANIC CHEMISTRY	4	0	4	C	4
OKT169	CALCULATION INDUSTRIAL CHEMISTRY	3	0	3	C	3
	TOTAL	25	2	26		30

Abbreviations: *T = Theoretical Course Hours; P = Practice Course Hours; Cr = Course Credit; C = Compulsory Course; E = Elective Course; ECTS = European Credit Transfer System*

1ST CLASS 2ND SEMESTER (SPRING SEMESTER)

COURSE CODE	COURSE NAME	T	P	Cr	C/E	ECTS
MAT102	MATHEMATICS-II	3	0	3	C	4
TRD110	TURKISH LANGUAGE-II	2	0	2	C	2
YDİ108	ENGLISH-II	2	0	2	C	2
OKT170	GENERAL CHEMISTRY-II	4	0	4	C	4
OKT174	PHYSICAL CHEMISTRY	4	0	4	C	4
OKT176	ORGANIC CHEMISTRY	4	0	4	C	4
OKT178	INORGANIC CHEMISTRY LABORATORY	0	4	2	C	4
OKT102	USE OF BASIC INFORMATION TECHNOLOGY	2	2	3	C	2
	ELECTIVE COURSE-1	2	0	2	E	2
	ELECTIVE COURSE-2	2	0	2	E	2
	TOTAL	25	6	28		30
ELECTIVE COURSES						
OKT168	BIOCHEMISTRY	2	0	2	E	2
OKT172	QUALITY CONTROL	2	0	2	E	2
OKT180	ENVIRONMENTAL CHEMISTRY	2	0	2	E	2

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2ND CLASS 1ST SEMESTER (FALL SEMESTER)

COURSE CODE	COURSE NAME	T	P	Cr	C/E	ECTS
AİT209	ATATURK'S PRINCIPLES AND HISTORY OF TURKISH REVOLUTION-I	2	0	2	C	2
OKT261	ANALYTICAL CHEMISTRY LABORATORY	0	4	2	C	3
OKT263	ORGANIC CHEMISTRY LABORATORY	0	4	2	C	3
OKT265	ORGANIC CHEMICAL TECHNOLOGY	2	0	2	C	2
OKT267	BIOTECHNOLOGY	2	0	2	C	2
OKT269	VOCATIONAL PRACTICE TRAINING-I	0	16	8	C	8
OKT271	INTERNSHIP EVALUATION	0	2	1	C	6
	OPTIONAL COURSE-1	2	0	2	E	2
	OPTIONAL COURSE-2	2	0	2	E	2
	TOTAL	10	26	23		30
ELECTIVE COURSES						
OKT273	PHARMACEUTICAL CHEMISTRY	2	0	2	E	2
OKT275	TEXTILE CHEMISTRY	2	0	2	E	2
OKT277	VOCATIONAL ENGLISH	2	0	2	E	2

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2ND CLASS 2ND SEMESTER (SPRING SEMESTER)

COURSE CODE	COURSE NAME	T	P	Cr	C/E	ECTS
AİT210	ATATURK'S PRINCIPLES AND HISTORY OF TURKISH REVOLUTION-II	2	0	2	C	2
OKT260	INSTRUMENTAL ANALYSIS	4	0	4	C	5
OKT262	PHYSICAL CHEMISTRY LABORATORY	0	4	2	C	4
OKT264	POLYMER TECHNOLOGY	2	0	2	C	2
OKT266	INORGANIC CHEMICAL TECHNOLOGY	2	0	2	C	3
OKT268	VOCATIONAL PRACTICE TRAINING-II	0	16	8	C	8
OKT270	OCCUPATIONAL HEALTH AND SAFETY	2	0	2	C	2
	OPTIONAL COURSE-1	2	0	2	E	2
	OPTIONAL COURSE-2	2	0	2	E	2
	TOTAL	16	20	26		30
ELECTIVE COURSES						
OKT272	MATERIAL TECHNOLOGY	2	0	2	E	2
OKT274	CHEMICAL KINETICS	2	0	2	E	2
OKT276	METHOD SELECTION IN CHEMICAL ANALYSIS	2	0	2	E	2

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COURSE CONTENTS		T	P	C	E

FİZ107 Physics 3 0 3 3

Types of motion, equations of motion, heat, expansion, contraction, energy concepts, general electrical information, various laws important in physics and thermodynamics, various applications and calculations.

MAT101 Mathematics-I 3 0 3 4

To provide the necessary and sufficient mathematical foundation by teaching the subjects within the scope of the course to the student efficiently, to enable her/him to understand the mathematical subjects in vocational courses better and to use the mathematical subjects he has learned in his profession.

TRD109 Turkish Language-I 2 0 2 2

To be able to comprehend that language is a product of the human mind, to comprehend the structural features and richness of the Turkish language, to comprehend the ways to be successful in written expression, to develop research, reading and information skills.

YDİ107 English-I 2 0 2 2

Ability to understand, read and speak the foreign language taught correctly.

OKT161 General Chemistry-I 4 0 4 5

•Introduction; •Atoms, molecules and ions; •Chemical Reactions-I: Chemical equations and aqueous solution reactions; •Chemical reactions-II: Mass relations; Properties of gases; •Thermochemistry; •Quantum theory and electronic structure of atoms; •Periodic relations between elements; •Chemical Bonding-I: Basic concepts; •Chemical bonding-II: Molecular geometry and molecular orbitals.

OKT163 General Chemistry Laboratory 0 2 1 2

Examines the application of general chemistry topics.

OKT165 Analytical Chemistry 4 0 4 5

•Introduction, simple equilibrium constant calculations; •Examination of the reliability of analytical data; •Temperature and pH effects on solubility; •Solutions, their concentrations and units; •Buffer solutions; •Indicators; •Chemical equilibrium; •Gravimetric analysis; •Volumetric analysis and acid-base titrations; •Oxidation-reduction titrations.

OKT167 Inorganic Chemistry 4 0 4 4

•Electron structure of the atom and periodic properties of the elements. Molecular structure; (Lewis dot structure and resonance, VSEPR theory, Symmetry in molecules, Symmetry operation and symmetry element, Point groups and determination), Chemical bonds, Molecular orbital theory, Drawing MO diagrams using symmetry

term symbols and character tables, Ionic and metal bonding, Solids and crystal structures. Transition metals and coordination compounds, Chemical bonding in coordination compounds, Coordination compounds and electronic spectrum; •Electronic transitions and selectivity rules, Extraction of term symbols, Use of Tanabe-Sugano diagrams, Interactions between electrons, Periodic system and properties of elements, Effects of interaction between particles and macroscopic properties, Acids-bases and their definitions.

OKT169 Calculation Industrial Chemistry 3 0 3 3

Water Technology, Fertilizer Technology, Cement Technology, Surface Coating Industry (paint, varnish, lacquer etc.), Agrochemicals (herbicides, pesticides etc.), Fragrances (perfumery) and Food Additives, Oils, Soaps and Detergents, Sugar Industry, Starch, Fermentation Industry, Plastic Industry, Paper Industry, Petroleum Industry, Pharmaceutical Industry. It covers calculations including processes.

MAT102 Mathematics-II 3 0 3 4

To provide the necessary and sufficient mathematical foundation by teaching the subjects within the scope of the course to the student efficiently, to enable him/her to understand the mathematical subjects in vocational courses better and to use the mathematical subjects he/she has learned in his/her profession.

YDİ108 English-II 2 0 2 2

Being able to understand, read and speak the foreign language taught correctly.

TRD110 Turkish Language-II 2 0 2 2

Being able to recognize the types of written expression in daily life, understanding the importance of punctuation in written expression, understanding the importance of correct expression in personal and social communication, being able to apply research, reading and information skills.

OKT170 General Chemistry-II 4 0 4 4

Chemical kinetics, Equilibrium, Equilibrium in aqueous solutions, Electrochemistry, Transition elements, Radioactivity, Organic chemistry.

OKT174 Physical Chemistry 4 0 4 4

Gases, ideal gas laws, kinetic molecular theory of gases, real gases, equations of state. First law of thermodynamics, thermochemistry, ideal gas relations, second and third laws of thermodynamics and chemical equilibrium.

OKT176 Organic Chemistry 4 0 4 4

•Introduction; •Chemical bonding; •Alkanes and cyclic alkanes; •Alcohols and alkyl halides; •Alkenes and alkynes; •Arenes and aromaticity; •Stereochemistry; •Nucleophilic substitution reactions; •Free radicals; •Properties of alcohols, ethers and phenols; •Carboxylic acids and their derivatives; •Amines.

OKT178 Inorganic Chemistry Laboratory 0 4 2 4

Physical methods in the laboratory, Comparison of transition elements with other elements, Complexes that tend to react, Bonding isomers, Oxidation states of metals, Preparation of cis and trans isomers of some complexes, Investigation of acid hydrolysis kinetics of trans complex, Schiff base complexes, Sensitivity of some complexes to magnetic fields, Investigation of some complexes by thermal methods.

OKT102 Use of Basic Information Technology 2 2 3 2

Basic DOS, Windows, Computer, Hardware and Software Keyboard Usage Skills, DOS Operating System, Windows Operating System, Using Databases, Using Information Networks, Preparing a Spreadsheet.

OKT168 Biochemistry 2 0 2 2

•Water, carbohydrates: structure and biological functions; •Lipids: structure and biological functions; •Amino acids, peptides and proteins: structure and biological functions; •Enzymes and enzyme kinetics; •Vitamins and coenzymes; •Nucleic acids: structure and biological functions.

OKT172 Quality Control 2 0 2 2

Basic Concepts of Quality Control, Total Quality Control and Its Stages, Basic Elements of Quality, Objectives of Quality Control and Affecting Factors, Basic Statistical Measures, Frequency Distributions and Their Evaluations, Probability and Probability Distributions, Standards and Specifications, Sampling, Reliability Concepts.

OKT180 Environmental Chemistry 2 0 2 2

•Air pollution; •Water pollution; •Noise pollution; •Soil pollution; •Organic and inorganic pollutants; •Radiation, radiation pollution; •Thermal pollution and prevention of these pollutions; •Ecological balance; •Factors causing global warming and greenhouse effect.

AİT209 Ataturk's Principles and History of Turkish Revolution-I 2 0 2 2

Definition of revolutionism, its stages, development environment, First World War, fronts, disintegration of the Ottoman Empire, armistice agreement, reactions against occupations, congresses, Kuvay-i Milliye and Misak-ı Milli, opening of the Turkish Grand National Assembly, establishment of the army, Sevres and Gyumri peace.

OKT261 Analytical Chemistry Laboratory 0 4 2 3

Covers the application of analytical chemistry topics.

OKT263 Organic Chemistry Laboratory 0 4 2 3

Covers application of organic chemistry topics.

OKT265 Organic Chemical Technology 2 0 2 2

•Agricultural chemicals; •Fragrance, flavor and taste giving substances and food additives; •Liquid and solid oils, waxes; •Soap and detergent industries; •Sugar industries; •Fermentation industries; •Paper industries; •Petroleum refining and production of petrochemicals and related factory flow diagrams are given.

OKT267 Biotechnology 2 0 2 2

•Introduction; •Importance of biotechnology; •Microorganism growth kinetics; •Nutrition medium optimization; •Environmental media (pH, mixing speed, inoculum amount, fermentation time etc.); •Batch medium fermentation; •Continuous medium fermentation; •Biotechnological production of organic acids (citric acid, oxalic acid etc.); •Biotechnological production of antibiotics; •Biotechnological treatment of wastewater and other environmental applications; •Biosorption and its applications.

OKT269 Vocational Practice Training-I 0 16 8 8

The program includes 14 weeks of workplace training, 2 working days a week, in a workplace related to the program. Introduction to industrial areas, demonstration of production stages, observation of working conditions of suitable companies, sharing of work experiences, introduction of industrial companies.

OKT271 Internship Evaluation 0 2 1 6

Evaluation of internship notebooks and presentation of internship.

OKT273 Pharmaceutical Chemistry 2 0 2 2

General information and history, Synthesis and properties of anesthetic compounds, Synthesis and properties of hypnotic compounds, synthetic analgesic drugs, Synthesis and properties of local anesthetic drugs, Drugs affecting the peripheral nervous system, Drugs affecting the autonomic nervous system, Chemotherapy.

OKT275 Textile Chemistry 2 0 2 2

General properties of textile fibers, Classification of textile fibers, Plant fibers, Animal fibers, Chemical fibers, Man-made fibers, Chemical fibers obtained from synthetic polymers, Color and color theories, Dyeing machines, Color fastnesses, General properties of boron substances, Dyeing of cellulosic fibers, Dyeing of protein fibers, Dyeing of polyamide fibers, Dyeing of polyester fibers, Dyeing of polyacrylonitrile fibers, Dyeing of fiber blends, Printing methods.

OKT277 Vocational English 2 0 2 2

Providing English equivalents of chemistry terms and laboratory equipment. Sentence structures in English, writing experimental setups as English paragraphs. Rules of translation technique from English to Turkish. Examining sentence structures on articles containing basic chemistry and industrial chemistry topics. Translating scientific articles into Turkish.

AİT210 Ataturk's Principles and History of Turkish Revolution-II 2 0 2 2

The War of Independence, the Battle of Sakarya, the Great Offensive, Republicanism and the Caliphate from Mudanya to Lausanne, the period of calm and democracy, nationalism, the principle of secularism, Turkey's agenda.

OKT260 Instrumental Analysis 4 0 4 5

•Introduction to electrochemical methods; •Potentiometry, conductivity and titrations; •Introduction to spectroscopic methods; •Ultraviolet and visible region absorption spectroscopy; •Infrared spectroscopy; •Flame emission spectroscopy; •Nuclear magnetic resonance spectroscopy; •X-ray spectroscopy; •Mass spectroscopy; •Thermal analysis; •Gas chromatography techniques.

OKT262 Physical Chemistry Laboratory 0 4 2 4

Introduction, determination of enthalpy of dissolution of ammonium oxalate, saponification of ethyl acetate, determination of molar mass by viscosity method, determination of molar mass by boiling point elevation, determination of molar mass by Victor-Meyer method, Homogeneous equilibrium, determination of partial molar volume, law of partition, determination of enthalpy of vaporization, refractive index.

OKT264 Polymer Technology 2 0 2 2

• Definition of basic concepts related to polymers, classification of polymers and raw materials of polymer technology; • Structure of polymers; • Molecular weight and distribution of polymers; • Polymer solutions; • Polymer melts; • Synthesis of polymers; • Polymerization processes; • Processing of polymers; • Basic properties of polymers, plastic technologies and industrial polymers such as synthetic fibers.

OKT266 Inorganic Chemical Technology 2 0 2 3

•Introduction; •Chemical and physical basic operations; •Possible work accidents in factories and their prevention; •R&D and Patent; •Chemical substance production and the duties of chemists; •Wastewater treatment and environmental pollution control; •Ceramic industries; Cement production processes; •Glass production processes; •Chlor-alkali and electrolytic industries; nitrogen industry; •Explosives, toxic chemicals issues and related factory flow diagrams.

OKT268 Vocational Practice Training-II 0 16 8 8

The program includes 14 weeks of workplace training, 2 working days a week, in a workplace related to the program. Introduction to industrial areas, demonstration of production stages, observation of working conditions of suitable companies, sharing of work experiences, introduction of industrial companies.

OKT270 Occupational Health and Safety 2 0 2 2

First aid training, first aid supplies, ensuring personal safety, ensuring employee safety, ensuring workplace safety.

OKT272 Material Technology 2 0 2 2

Materials used in technical fields, basic concepts related to atomic structure, bonds between atoms and molecules, types of unit lattice, basic concepts related to solidification and melting, solidification and cooling curves of pure and alloyed metals, dendritic and grain formation during solidification, crystal defects, pure metal, intermediate phase or compound solid solution, alloys, polymer blends.

OKT274 Chemical Kinetics 2 0 2 2

Reaction rate, reaction order and molecularity, reaction rate constant, determination of reaction order, effect of temperature and activation energy on reaction rate, collision theory, absolute reaction rate theory, kinetic study of reactions occurring in solution, complex reactions, chain reactions, catalysis, adsorption kinetics, enzyme reactions, photochemistry.

OKT276 Method Selection in Chemical Analysis 2 0 2 2

What is chemical analysis, analytical assignment and features to be considered, steps of chemical analysis and their features, points to be considered in the analysis of main components, side components and trace elements, sampling and sample preparation techniques, selection of the appropriate method according to the amount of substance and the feature of the sample, enrichment and separation techniques and their features, methods and features used in the analysis of polymeric substances and organic compounds, evaluation of the information obtained from the analysis of polymeric substances and organic compounds, statistical evaluation of data, error types of tests applied in data statistics, evaluation of differences between experimental results.