**MUNZUR UNIVERSITY TUNCELİ VOCATIONAL SCHOOL**
**DEPARTMENT OF CHEMISTRY AND CHEMICAL PROCESS TECHNOLOGIES**
**LABORATORY TECHNOLOGY PROGRAM FOUR-SEMESTER TEACHING PLAN**

**FIRST CLASS**

| | **I. SEMESTER** | | | | | | |
|---|---|---|---|---|---|---|---|
| **Course Code** | **COURSES** | **C/E** | **Weekly Course Hours** | | | **Total Credit** | **ECTS** |
| | | | **Total** | **Theory** | **Prac.** | | |
| TRD101 | Turkish Language I | C | 2 | 2 | 0 | 2 | 2 |
| AİT101 | Atatürk's First and Revolution History I | C | 2 | 2 | 0 | 2 | 2 |
| YBD101 | English I | C | 2 | 2 | 0 | 2 | 2 |
| MAT101 | Mathematıcs | C | 2 | 2 | 0 | 2 | 3 |
| LTP103 | General Chemistry | C | 3 | 3 | 0 | 3 | 4 |
| LTP107 | Basic Information Technologies | C | 3 | 1 | 2 | 2 | 3 |
| LTP101 | General Biology | C | 2 | 2 | 0 | 2 | 3 |
| LTP105 | General Microbiology | C | 4 | 2 | 2 | 3 | 4 |
| LTP111 | Biochemistry | C | 3 | 3 | 0 | 3 | 3 |
| **LPT109** | Occupational Safety and Health in the Laboratory | C | 2 | 2 | 0 | 2 | 4 |
| TOTAL | | | 25 | 21 | 4 | 23 | 30 |

*** C: Compulsory E: Elective**

| | **II. SEMESTER** | | | | | | |
|---|---|---|---|---|---|---|---|
| **Course Code** | **COURSES** | **C/E** | **Weekly Course Hours** | | | **Total Credit** | **ECTS** |
| | | | **Total** | **Theory** | **Prac.** | | |
| TRD102 | Turkish Language II | C | 2 | 2 | 0 | 2 | 2 |
| AİT102 | Atatürk's First and Revolution History II | C | 2 | 2 | 0 | 2 | 2 |
| YBD101 | English II | C | 2 | 2 | 0 | 2 | 2 |
| LTP110 | Laboratory Equipment Maintenance and Use | C | 4 | 2 | 1 | 2,5 | 4 |
| LTP112 | Analytical Chemistry I | C | 3 | 3 | 0 | 3 | 4 |
| LTP104 | Organic Chemistry | C | 3 | 3 | 0 | 3 | 4 |
| LTP108 | Analytical Chemistry Laboratory I | C | 3 | 0 | 3 | 1,5 | 4 |
| LTP102 | General Chemistry Laboratory | C | 3 | 0 | 3 | 1,5 | 4 |
| LTP210 | Clinical Biochemistry and Analyses | C | 3 | 2 | 1 | 2,5 | 4 |
| TOTAL | | | 24 | 16 | 8 | 20 | 30 |

*** C: Compulsory E: Elective**

## SECOND CLASS

| | III. SEMESTER | | | | | | |
|---|---|---|---|---|---|---|---|
| **Course Code** | **COURSES** | **Z/S** | **Weekly Course Hours** | | | **Total Credit** | **ECTS** |
| | | | **Total** | **Theory** | **Prac.** | | |
| LTP201 | Analytical Chemistry II | C | 3 | 3 | 0 | 3 | 4 |
| LTP207 | Analytical Chemistry Laboratory II | C | 3 | 0 | 3 | 1,5 | 3 |
| LTP215 | Analytical Separation Methods | C | 2 | 2 | 0 | 2 | 2 |
| LTP203 | Water Analysis | C | 3 | 2 | 1 | 2,5 | 3 |
| LTP213 | Soil Analysis | C | 3 | 2 | 1 | 2,5 | 3 |
| LTP205 | Plant Analysis | C | 3 | 2 | 1 | 2,5 | 3 |
| LTP216 | Vocational Education Study | C | 4 | 2 | 2 | 3 | 8 |
| TOTAL | | | 21 | 13 | 8 | 17 | 26 |
| Internship | | C | 0 | 0 | 0 | 0 | 2 |

*** C: Compulsory E: Elective**

* *III. Semester 4-credit course must be chosen from the elective courses.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| LTB203 | Textiles and Dyestuffs | E | 2 | 2 | 0 | 2 | 2 |
| LNT205 | Nano Technology and Application Areas | E | 2 | 2 | 0 | 2 | 2 |
| **TOTAL** | | | 4 | 4 | 0 | 4 | 4 |

| | IV. SEMESTER | | | | | | |
|---|---|---|---|---|---|---|---|
| **Course Code** | **COURSES** | **C/E** | **Weekly Course Hours** | | | **Total Credit** | **ECTS** |
| | | | **Total** | **Theory** | **Prac.** | | |
| LTP212 | Industrial Analysis Techniques | C | 3 | 2 | 1 | 2,5 | 4 |
| LTP214 | Food Analysis | C | 3 | 2 | 1 | 2,5 | 4 |
| LTP208 | Environmental Chemistry | C | 2 | 2 | 0 | 2 | 2 |
| LTP209 | Agricultural Medicines and Analyzes | C | 3 | 2 | 1 | 2,5 | 3 |
| LTP206 | Communication | C | 2 | 2 | 0 | 2 | 2 |
| LTP202 | Biomedical Devices | C | 2 | 2 | 0 | 2 | 3 |
| LTP114 | Instrumental Analysis | C | 4 | 2 | 2 | 3 | 4 |
| **LPT 218** | Quality Assurance and Standards | C | 2 | 2 | 0 | 2 | 4 |
| **TOTAL** | | C | 19 | 14 | 5 | 16,5 | 26 |

*** C: Compulsory E: Elective**

*** IV. Semester 4-credit course must be chosen from the elective courses.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| GÖN101 | Volunteering | E | 2 | 2 | 0 | 2 | 2 |
| LTP220 | Entrepreneurship | E | 2 | 2 | 0 | 2 | 2 |
| **TOTAL** | | | 4 | 4 | 0 | 4 | 4 |

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**LABORATORY TECHNOLOGY PROGRAM**
**COURSE CONTENT**

## 1ST YEAR I. SEMESTER

### TRD101 TURKISH LANGUAGE-I
Language, languages and Turkish language, grammar, words and sentences, word types, elements of expression and types of expression, basic principles of smooth and effective speaking.

### AİT101 ATATÜRK PRINCIPLES AND HISTORY OF REVOLUTION I
Basic concepts, Reforms made by the Ottoman Empire before the Turkish Revolution, the preparation period of the Turkish Revolution, Turkish War of Independence.

### YBD101 ENGLISH-I
Time clauses, what-who-where (wh) questions, helping verbs (am, is, are), Countries and cities, present continuous tense, many and how much, prepositions, have-has got, how many, there is-there are, quiz.

### MAT101 MATHEMATICS
Numbers, variable and function, limits in number sequences and functions, some special limits, continuity in functions, derivative and differential, trigonometry and trigonometric functions, exponential function, logarithm, logarithmic functions, hyperbolic functions, applications of derivative, applications of integral.

### LTP101 GENERAL BIOLOGY
Definition and significance of biology, certain important biological fields and certain biological concepts, cellular structure, cellular membrane, cytoplasm and organelles, cell nucleus, cellular energy production, cellular respiration, photosynthesis event, chromosomes and nucleic acids.

### LTP103 GENERAL CHEMISTRY
Matter and its Properties, Atom and its structure, Compounds, Mole concept, Periodic table, Chemical Reactions, Liquids, Solids, Gases, Chemical bonds and equations, Solutions, acids and bases, chemical equilibrium, chemical thermodynamics.

### LTP105 GENERAL MICROBIOLOGY
Classification, structure, reproduction and metabolism of microorganisms.

### LTP107 BASIC INFORMATION TECHNOLOGIES
Computer Basic Concepts, Internet and Services, Windows 7, MS Word, MS Excel, MS PowerPoint usage.

### LPT109 OCCUPATIONAL SAFETY AND HEALTH IN THE LABORATORY
Definition and history of occupational safety, Occupational Diseases and ways to prevent them, Occupational safety in electrical and non-electrical tools in the workshop, Protectives in occupational safety, First Aid rules, Safety precautions in Fire and Explosions.

**LTP111 BIOCHEMISTRY**

Introduction to biochemistry, chemical bonds and aqueous solutions, biomolecules, structure and properties of proteins, amino acids, enzymes, structure and properties of carbohydrates, monosaccharides, disaccharides, polysaccharides, structure and properties of lipids, fatty acids, phospholipids, glycolipids, hormones.

## II.SEMESTER

**TRD 102 TURKISH LANGUAGE II**

Oral and written expression and its features, composition arrangements, grammar, correct use of spelling and punctuation rules, words and spelling guide, principles and techniques of speech and discussion, oral and written expression disorders.

**AİT 102 ATATÜRK PRINCIPLES AND HISTORY OF REVOLUTION II**

Atatürk's revolutions and their aims (political, legal, educational and cultural, social and economic revolutions), Atatürk's principles (republicanism, nationalism, populism, secularism, statism, revolutionism), complementary principles, the qualities of the Turkish revolution, the universal values of the Turkish revolution.

**YBD102 ENGLISH-II**

Using be and have, Present Progressive tense, Past Progressive tense, Nouns s1ome-any, Some special verbs and expressions, Simple past tense, Expressing ability, Nouns pronouns, Making comparisons, Superlative forms, Present perfect tense, Adjectives, Adverbs.

**LTP102 GENERAL CHEMISTRY LABORATORY**

Laboratory rules, glassware and basic tools and equipment used in the laboratory, solution preparation, determination of the solubility of a salt, stoichiometric calculation, pH and indicators, acid-base titration, heat of dissolution and heat of reaction calculation, determination of acid in vinegar.

**LTP104 ORGANIC CHEMISTRY**

Atoms and Molecules, Orbitals and Bonding, Structure Isomer, Stereochemistry, Alkyl Halides, Free Radical Reactions, Alcohols, Alkenes and Alkynes

**LTP108 ANALYTICAL CHEMISTRY LABORATORY I**

Systematic analysis of Group I, II, III, IV and V anions and cations.

**LTP110 LABORATORY INSTRUMENTS MAINTENANCE AND USE**

Glassware used in the laboratory, safety equipment, tools and devices used for mixing (magnetic stirrer, mechanical mixer, ultrasonic homogenizer, vortex, shaker, etc.), tools and devices used for heating (magnetic stirrer with heater, burner, oven, balloon heater, muffle furnace, jacketed heating system, etc.), centrifugal device, ultrapure water device, ultrasonic bath, pH meter.

**LTP112 ANALYTICAL CHEMISTRY I**

Introduction to analytical chemistry, Errors in chemical analysis, Aqueous solutions and chemical equilibrium, Effect of electrolytes on chemical balances, solution of equilibrium problems, Gravimetric analysis methods, Titrimetric analysis methods.

**LTP210 CLINICAL BIOCHEMISTRY AND ANALYZES**

Organization of clinical biochemistry laboratories and clinical biochemistry laboratory rules, classification of clinical biochemical analyses, factors that affect the laboratory test results, quality in clinical biochemical laboratory, procurement, transportation, and process of clinical biochemical laboratory materials and kidney and urine biochemistry.

## III. SEMESTER

**LTP201 ANALYTICAL CHEMISTRY II**

Aqueous solutions and chemical equilibrium, gravimetric analysis methods, titrimetric methods, precipitation titrimetry.

**LTP203 WATER ANALYSIS**

Structure and properties of water, classification of water, quality in waters, collecting water samples, water sampling locations, storage of water samples, water analysis, collecting and analysing physical, chemical and microbiological water samples, the frequency of water sampling.

**LTP205 PLANT ANALYSIS**

Plant roots and root systems, their benefits, taking plant samples, preparing them for analysis, burning the samples fresh and dry, and performing various mineral analyses in plant samples.

**LTP207 ANALYTICAL CHEMISTRY LABORATORY II**

Gravimetric analysis, acid-base titrations, Precipitation titrations, Complexometric titrations (EDTA), Oxidation-reduction titrations.

**LTP213 SOIL ANALYSIS**

Soil classification, soil reactions, soil organisms, soil organic matter, soil air and temperature. Taking soil samples and preparing them for analysis, drying, grinding, sifting and storing. Physical and chemical soil analyses.

**LTP215 ANALYTICAL SEPARATION METHODS**

Basic principles of chromatographic methods, Gas Chromatography (GC), High Pressure Liquid Chromatography, Thin layer chromatography, Paper chromatography.

**LTP216 VOCATIONAL EDUCATION STUDY**

The student can make career plans for his/her vocational education, study, research, report and orally present a subject related to his/her profession.

## ELECTIVE COURSE

**LTB203 TEXTILES AND DYESTUFFS**

General properties of textile fibers, Plant fibers, Animal fibers, Colourfulness, Dyestuffs and their properties, dyeing techniques.

**LTN205 NANOTECHNOLOGY AND APPLICATION AREAS**

Definition and concept of nanotechnology, Electron microscope, Nanomaterial production techniques, Top-down production techniques, Bottom-up production techniques, Nanotubes, Application areas of nanotechnology, Applications in the field of health, Applications in the field of textiles, Applications in the field of building materials, Applications in the field of agriculture, Applications in the field of energy.

## IV. SEMESTER

**LTP202 BIOMEDICAL DEVICES**

Biomedical equipments, fields of use, the duties and responsibilities of biomedical equipment technicians, classification of biomedical equipments, risk and safety in medical equipments, operational warnings and safety signs in these equipments, electrical safety and residual current tests in biomedical equipments, effects of electrical current on the human body.

**LTP206 COMMUNICATION**

Basic elements of communication, communication in terms of functioning, communication skills within the organization and group, the importance of written, verbal and non-verbal communication and the techniques used.

**LTP208 ENVIRONMENTAL CHEMISTRY**

Environmental Pollution, sources and types, domestic solid waste, industrial solid waste, hazardous solid waste, atmospheric transport of heavy metals and other pollutants, noise pollution, soil pollution,

**LTP209 AGRICULTURAL DRUG AND ANALYZES**

Benefits and types of pesticides, risks associated with the use of pesticides, the behaviour of pesticides in ecosystems, analysis of pesticide residues

**LTP212 INDUSTRIAL ANALYSIS TECHNIQUES**

Industry definition and industrial processes, Fuel analysis, Cement and analysis, Liquid detergent preparation, Chemical fertilizer and analysis, Glass and analysis, Lime and analysis, Petrochemical products and analysis, Biodiesel production.

**LTP214 FOOD ANALYSIS**

Taking samples from foods, preparing samples for analysis, general analysis methods used in food businesses: moisture (water) determination, dry matter determination, ash determination, carbohydrate, fat, protein determination.

**LPT 218 QUALITY ASSURANCE STANDARDS**

Standard and standardization, benefits of standardization, types of standards in Turkey, standardization and standard preparation studies. Certification, Accreditation and TSE's Certification Activities International Standardization Studies, TSE Certification calibration studies and organization.

**LTP114 INSTRUMENTAL ANALYSIS**

Analysis techniques, modern spectroscopic techniques, UV-Vis. spectroscopy, Atomic absorption spectroscopy, Infrared spectroscopy, NMR spectroscopy, General information about mass spectrometry.

## ELECTIVE COURSE

**GÖN101 VOLUNTEERING ACTIVITIES**

Concept of volunteering and volunteer management, Basic areas of volunteering (Afad, Environment, Education, Culture, Sports, Health, Social Services), The importance of community service practices, identifying current problems of the society and producing projects to find solutions, social responsibility, communication and communication processes.

**LTP220 ENTREPRENEURSHIP**

Entrepreneurship and entrepreneurial characteristics, processes, applications, management strategies. Entrepreneurship culture, contributions of entrepreneurship to the economy, types of entrepreneurship, project plan requirements, project plan preparation. Creating a business canvas. Revenue and business model preparation.