



### 1. SEMESTER

Code	Course Name	Semester	T+P (Hours)	ECTS	C / E
ATA101	History of Atatürk's Principles and Revolutions I	1	2 + 0	2.0	Z
Emergency of Modern Turkey, Thoughts and Principles					
BSÜ100	Extracurricular Activities	1	1 + 1	3.0	S
Social, Scientific, Cultural and Artistic Activities					
ENG101	English I	1	2 + 0	2.0	Z
Basic English Grammar, Vocabulary, Reading, Writing and Speaking skills.					
FZ101	Physics I	1	3 + 1	4.0	Z
Physics and measurement, vectors, motion in one dimension, motion in plane and space, circular motion and miscellaneous applications of Newton's laws, work and kinetic energy, potential energy and conservation of energy, linear momentum and collisions, rotation, rolling and angular momentum, static equilibrium and elasticity, vibrations, the universal law of gravitation					
KIM105	General Chemistry I	1	3 + 0	4.0	Z
Matter and its properties, classification and measurement of the matter, the meaningful numbers, atomic theories, subatomic particles, quantum numbers, electronic distribution, periodic table, periodic properties of atoms, chemical bonds (ionic-covalent), Lewis structures, nomenclature of compounds, deviations from octet rule, resonance, valence bond theory, hybrid orbitals, molecular geometry, molecular orbital theory, metallic bond, element-compound-mixture concepts, concept of moles, chemical reactions, stoichiometry, thermochemistry, energy, heat, enthalpy, gases, gas laws, ideal gases, real gases, liquid state and properties, solid state and properties, phase diagrams, ionic crystals, intermolecular forces, solutions and properties, solution concentrations, acid-base reactions, redox reactions, aqueous solution reactions					
MAT101	General Mathematics	1	3 + 1	4.0	Z
Function, limit, continuity, derivative, application of the derivative, curve sketching, differential, linear approximation, indefinite integral.					
MBG101	General Biology I	1	3 + 3	7.0	Z
History of botany, importance of classification in plants, prokaryotic and eukaryotic organisms, structure of plant cell and organelles, molecules of life, cell division, protein synthesis, plant tissues and functions, plant organs and functions, vegetative organs, generative organs; reproduction of plants.					
MBG109	Occupational Safety and Health I	1	2 + 0	2.0	Z
Definitions, concepts, regulations in work safety, commissions, management systems in work safety, risk management, occupational hygiene, policies of protection, fire, emergency plans.					
TOS116	Physical Education and Sports	1	2 + 0	3.0	S
Basic concepts related to physical education and sports, basic knowledge about sports facilities, basic information about some sports branches, nutrition, first aid, lifelong sports.					
TOS130	Career Planning	1	2 + 0	3.0	S
Bu derste kariyer planlama ve geliştirme ile ilişkili kavramları, kariyer yönetimi uygulamaları ve araçları, kariyer devreleri ve kariyer sorunları ve çözümleri ile ilgili konulara değinilecektir.					
TOS136	Fighting Addiction and Addiction	1	2 + 0	3.0	S
TOS190	Academic Turkish	1	2 + 0	3.0	S
TRK101	Turkish Language I	1	2 + 0	2.0	Z
What is language? The role and significance of language in social life, the relation between language and culture, the languages in the world and types of language, historical development of Turkish language, the main alphabets used by Turks and the current state of Turkish language, the sounds and classification of sounds in Turkish language, knowledge of vocabulary and sentence, orthographic rules, punctuation, expression disorders and current problems of Turkish language.					

## 2. SEMESTER

Code	Course Name	Semester	T+P (Hours)	ECTS	C / E
ATA102	History of Atatürk's Principles and Revolutions II	2	2 + 0	2.0	Z
Events in the birth and development of the Republic of Turkey, ideas and principles					
BSÜ100	Extracurricular Activities	2	1 + 1	3.0	S
Social, Scientific, Cultural and Artistic Activities					
ENG102	English II	2	2 + 0	2.0	Z
Elementary level of English grammar, vocabulary, reading comprehension.					
FZ102	Physics II	2	3 + 0	4.0	Z
Basic principles and theories of electromagnetic concepts: Coulomb's law, Electric field, Gauss's law, Electric potential, DC Electric circuits, Magnetic field, Sources of magnetic fields, Ampere's law, Faraday's law, Magnetic properties of matter, AC circuits, Maxwell's equations, Electromagnetic wave concept.					
GST106	History of Art	2	2 + 0	3.0	S
art history from pre-historic period to 20th century					
GST116	Biomimicry	2	2 + 0	3.0	S
KIM106	General Chemistry II	2	3 + 3	6.0	Z
Chemical kinetic and equation, acids and base, equation of acid-base, solubility and complex ion equation, enthalpy and free energy, electrochemistry, metals and ammetals, transition metals, complexions, nuclear chemistry, coordination compounds, organic chemistry					
MBG102	General Biology II	2	3 + 3	7.0	Z
Basic information about animal biology and ecology and animal tissues					
MBG108	Biostatistics	2	3 + 0	4.0	Z
Populasyon, örnek ve örnek alma, tablo ve grafik yapımı yöntemleri, merkezi eğilim ve varyasyon ölçüleri, çeşitlilik indeksleri, ortalamaların dağılımı ve standart hata, teorik dağılımlar, uyum testleri, hipotez testleri, populasyon ortalamasının güven sınırları, parametrik olmayan testler, varyans analizine giriş, basit lineer regresyon ve korelasyon					
TOS117	Volunteering Studies	2	2 + 0	3.0	S
Sosyal sorumluluk kavramı ve gelişimi, Türkiye'de sosyal sorumluluğun gelişimi, sosyal sorumluluk alanları, sosyal sorumluluk planlaması, sosyal sorumluluk iletişim stratejisi, sosyal sorumluluk kampanya hedefleri, sosyal sorumluluk kampanya değerlendirilmesi, örnek sosyal sorumluluk ve gönüllülük kampanya sunumları.					
TOS119	Sport for All	2	2 + 0	3.0	S
History of Sport for All and development process, the expansion of the Sport for All concept in Turkey and organization of sports philosophy for everyone in the world, and life-long sports practice, Health and Exercise, Lifetime Fitness applications, obesity and weight control, children and young people in sport, Sports for the elderly, Fitness applications, Outdoor sports					
TOS130	Career Planning	2	2 + 0	3.0	S
Giriş. Kariyer planlamasının ve gelişiminin önemi. Etkin CV hazırlama. Başarılı iş başvuruları ve iş görüşmeleri. Mühendislikte kariyer planlama. Türkiye'de mühendislik bölümlerinin mevcut durumu ve sorunları. Dünya mühendislik alanında faaliyet gösteren sektörlerin durumu ve geleceği. Başarılı yöneticilerin ve mühendislerin kariyeriyle ilgili deneyimlerini aktarması ve çalışma hayatıyla ilgili önerilerini sunması.					
TOS136	Fighting Addiction and Addiction	2	2 + 0	3.0	S
TOS190	Academic Turkish	2	2 + 0	3.0	S
Eğitimlerine devam eden ulusal ve uluslararası öğrencilerin Türkçe okuma, dinleme, konuşma ve yazma dil becerilerini geliştirmeye yönelik okuma metinleri, dinleme kayıtları, konuşma görevleri ve yazma konularının sınıf içi etkinlikleri. Öğrencilerin Türkçe tez, makale, sunum, rapor vb. gibi bilimsel çalışmalar hazırlayabilmesine yönelik faaliyetler. Öğrencilerin Türkçe film, tiyatro oyunu, radyo oyunu vb. gibi işitsel ve görsel sanatsal yapıtları anlayıp yorumlar yapabilmesine yönelik faaliyetler. Öğrencilerin herhangi bir konu hakkında Türkçe hazırladıkları bilimsel çalışmalar topluluk önünde işitsel ve görsel olarak sunabilmelerine yönelik faaliyetler.					
TRK102	Turkish Language II	2	2 + 0	2.0	Z
General information about composition, types of written composition, poetry, theatre, story and novel, epopee, tale-travel writing-memory, oral composition and its types, access to information resources and use of library, the techniques of scientific writing, the world of literature and idea.					













### 3. SEMESTER

Code	Course Name	Semester	T+P (Hours)	ECTS	C / E
KIM211	Organic Chemistry I	3	3 + 0	4.0	Z
Atom, molecule, chemical bonds, intermolecular interactions, carbon bonding, hybridization, organic reactions, acidic basic species, stereochemistry, alkanes, cycloalkanes, alkenes and alkynes synthesis and reactions, substitution and elimination reactions of alkyl halides					
MBG201	Cell Biology I	3	3 + 3	7.0	Z
Cell chemistry and biosynthesis, bioenergetic, structure and properties of membrane, energy transformation in mitochondria and chloroplasts, transport thermodynamic, structure and functions of organelles (nucleus, mitochondria, plastid, endoplasmic reticulum, ribosome, golgi apparatus, lysosome, peroxisomes, vacuol), intracellular traffic of proteins, membrane fusion and vesicular transport, cell skeleton					
MBG205	Molecular Biology I	3	3 + 3	7.0	Z
Structures, properties and synthesis of biological macromolecules, basic genetic mechanisms, control of gene expression, transposable DNAs, plasmids, genetics of viral groups, evolution of the cell, cell nucleus, cell signalling, cell skeleton, cycle of cell division, cell division mechanisms					
MBG210	Genetic	3	3 + 0	4.0	Z
Basic concepts of Mendelian genetics, chromosome theory in heredity, structure and function of genes, gene expression and its regulation, mutations and chromosomal defects, developmental, behavioural and population genetics and basic principles of evolutionary genetics					
MBG215	Molecular Terminology	3	3 + 0	4.0	S
Introduction to terminology, terms used in molecular biology, terms used in molecular genetics, terms used in biotechnology, terms used in cancer biology, terms used in molecular biology and genetics research, terms used in next generation technology					
MBG217	Systematic Biology	3	3 + 0	4.0	S
An overview of the diversity of the biosphere; species and speciation; terms and concepts of contemporary taxonomy; phylogeny, homology, analogy, phenetic and cladistic approaches to taxonomy, systematics of Mreana, Fungi, Protista, Plantae and Animalia					
MBG219	Plant Biology	3	3 + 0	4.0	S
Structure, Properties of Plant Cell, Properties of Plant Tissues, Root Structure and Growth in Roots; Formation of Side Roots, Radial Growth, Plant Nutrients and Water Intake and Transport, Xylem, Micro and Macro Nutrient Elements and Functions in Cells, Body Structure and Trunk Growth; Growth, Radial Growth, Hormonal Control, Growth and Development of Leaves; Leaf Structure, Plastid Metabolism, Structure and Principle of Stomata, Growth and Development of Flowers; Flower Structure, Pollination and Pollen Development, Importance of Seed in Fruit Development, Dormancy, Seed Germination, Photosynthesis, Transport of Photosynthetic Products, Phloem, C3, C4 and CAM Metabolism of Plants, Nitrogen Assimilation in Plants, Hormonal Control in Plant Growth and Development (Auksins, Gibberellin, Cytokinin, Absisisk Acid), Biotic and Abiotic Factors Affecting Plant Growth and Development, Respiration					
SSC112	First Aid and Rehabilitation	3	2 + 1	4.0	S
General First aid information, Patient and crime scene assessment, basic life support, first aid in bleeding, first aid in injuries, burns, freezing, first aid in heat stroke, fracture, dislocation, first aid in sprains, first aid in consciousness techniques.					

#### 4. SEMESTER

Code	Course Name	Semester	T+P (Hours)	ECTS	C / E
KIM212	Organic Chemistry II	4	3 + 2	5.0	Z
Benzene, aromaticity and electrophilic aromatic substitution reactions, substituted benzenes. Alcohols, ethers, aldehydes and ketones, carboxylic acids, esters, amides, amines, heterocyclic compounds and their general characteristics, synthesis and reactions. General properties of carbohydrate, lipid, amino acid, protein and nucleic acids.					
KIM216	Instrumental Analysis	4	2 + 0	4.0	S
Introduction, Analysis Techniques, Modern spectroscopic techniques, Matter-light interaction, Absorption, UV-Vis. spectroscopy, Atomic absorption spectroscopy and other similar techniques, Atomic absorption instrument, Interferences and correction systems. Plasma spectroscopy, instrument and interferences. Infrared spectroscopy, instrument and theory, IR spectrums and evaluation. NMR spectroscopy, instrument and theory, NMR spectrums and evaluations, Mass spectroscopy, instrument and theory, Mass spectrums and evaluations, Chromatographic methods; Theory, application and evaluating spectrums, Thermal Analysis					
MBG202	Cell Biology II	4	3 + 0	4.0	Z
Cell-to-cell connections, extracellular matrix and their functions, molecular mechanism of cell division, cell cycle and their control, gametes (sperm, ovum) and fertilization, importance of the cell cycle in duplication, signal transduction and their components, signal transduction pathways in bacteria, mammalian cells and plants, cell differentiation and development in multi-cellular organisms, stem cells and regeneration, components and functions of immune system, cancer biology and their development, basic cancer diagnostic and therapy, ageing, apoptosis					
MBG206	Molecular Biology II	4	3 + 3	6.0	Z
Cell connections, cell adhesion and extracellular matrix, gametes and fertilization, cellular mechanisms of development, care and repair of differentiated cell and tissue, cancer, basics of genetic engineering, molecular biology of the immune system					
MBG212	Model Organisms	4	2 + 0	4.0	S
Introduction to model organisms, bacteriophages, bacteria, yeasts, algae, plants, zebrafish, mice, rules for working with experimental animals and ethics.					
MBG216	Molecular Techniques	4	2 + 2	4.0	S
history of molecular biology and genetic area, DNA isolation, RNA isolation, basic knowledge about PCR, variety of PCR, maldi-TOF, flow cytometry					
MBG218	Ecology	4	3 + 0	4.0	Z
The subject of ecology, its definition and parts; basic concepts related to ecology; biotic and abiotic factors; terrestrial ecosystem; marine ecosystem; freshwater ecosystem; population ecology, ecology and ecosystem ecology, urban ecology, environmental pollution and control					
MBG220	Bioethics	4	3 + 0	3.0	Z
Prenatal, preimplantation diagnosis ethics, frozen embryos, adoption by embryo method, vaccines, suffering, herbal life, food and hydration support, organ donation and brain death, euthanasia, advanced medical directives, testament.					
PFE202	Introduction to Education (Pedagogic Formation)	4	3 + 0	4.0	S
Eğitim ve öğretimle ilgili temel kavramlar; eğitimin amaçları ve işlevleri; eğitimin diğer alanlarla ve bilimlerle ilişkisi; eğitimin hukuki, sosyal, kültürel, tarihî, politik, ekonomik, felsefi ve psikolojik temelleri; eğitim bilimlerinde yöntem; bir eğitim ve öğrenme ortamı olarak okul ve sınıf; öğretmenlik mesleği ve öğretmen yetiştirmede güncel gelişmeler; yirmi birinci yüzyılda eğitimle ilgili yönelimler.					
PFE204	Education Psychology (Pedagogic Formation)	4	3 + 0	4.0	S

## 5. SEMESTER

Code	Course Name	Semester	T+P (Hours)	ECTS	C / E	
MBG301	Biochemistry I	5	3 + 3	6.0	Z	
Life and molecules, amino acids, protein structure and function, enzymes and the basis of enzyme kinetics, enzymatic catalysis mechanisms, carbohydrates, lipids, nucleic acids, structure and functions of cell membrane, DNA as genetic material, DNA replication, transcription, translation and regulation of gene expression.						
MBG307	Physiology I	5	3 + 3	6.0	Z	
Water chemical structure, balance of water in plant, mineral nutrients, Photosynthesis; Light reaction, Photosynthesis: Carbon Reaction, transport system in Phloem, Respiration and fatty metabolisms, Mineral Nutrient uptake, Phytochrome and regulation of plant development by light, Plant hormone						
MBG309	Microbiology	5	3 + 3	6.0	Z	
Structure, functions, growth and increases of microorganisms (bacteria, yeast, fungi and viruses), classification and various activities of bacteria, physiology, metabolism and genetics, identification and control of microorganisms, microorganism-environment interactions, microbial pathogenesis and immunology, human-microorganism interactions, dyeing methods, Observing various properties of microorganisms in the laboratory						
MBG310	Developmental Biology	5	3 + 0	4.0	Z	
Development models, cell differentiation mechanisms, determination of cell destiny and embryonic axis, intercellular interaction during organ formation						
MBG319	Enzymology	5	3 + 0	4.0	S	
Enzymes and the differences between the normal catalytic materials, catalytic materials, chemical structure of enzymes, coenzymes and cofactors in the chemical structures, chemical structures, biological cofactors and coenzymes important coenzymes and transfer their groups, Biologic coenzymes, Factors affecting the activity of enzyme, temperature, pH, concentration and other factors effects of activity, enzyme kinetics, Km, enzyme conformational changes, Conformation, the specificity of enzymes. Specificity, allosteric enzymes, activators and inhibitors of enzymes Classification						
MBG321	Histology	5	3 + 0	4.0	S	
General histological principles, classification of animal tissues, Epithelial tissue (classification of epithelial tissue, epithelium, cytological features, specimens, cell surface specialization in epithelium), Connective tissue and intercellular material tissue (tissue forming cells and their activities, plasma and structure, lymphatic tissue and lymphoid organs), cartilage tissue (tissue forming cells and their activities, cartilage tissue types), bone tissue (tissue forming cells and activities, types of bone tissue, bone formation), Muscle tissue (cytological features of tissue forming cells), Muscle tissue (muscle tissue types and mechanisms of contraction of muscles), Nervous tissue (classification and cytological features of nerve cells), Nerve tissue.						
MBG323	Mycology	5	3 + 0	4.0	S	
History of fungi, morphological features, cellular structures, reproduction methods, fungal infectious agents, fungal infections, industrial uses of fungi and biotechnological uses of fungi						
MBG325	Cytogenetic	5	2 + 2	4.0	S	
MBG327	Transgenic Plant Technology	5	3 + 0	4.0	S	
Why is transgenic plant technology needed?, direct and indirect gene transfer methods for obtaining transgenic plants, transgenic plants for resistance to abiotic and biotic stresses, omics technologies, transgenic plants for phytoremediation of miRNAs and heavy metals, approaches related to genetically modified organisms.						
MBG331	Population Genetics	5	3 + 0	4.0	S	
The genetic structures of populations, the factors influencing these structures, species, and speciation.						
PFE301	Teaching Principles and Methods (Pedagogic Formation)	5	3 + 0	4.0	S	
Basic Concepts Principles of Teaching Learning and teaching theories Teaching models/approaches Teaching strategies Thinking Skills Teaching Methods Teaching Techniques Discussion Techniques Concept Teaching Techniques Individual Teaching Techniques Out-of-class teaching techniques Group Teaching Techniques Lesson Plan Preparation						
PFE303	Instructional Technologies (Pedagogic Formation)	5	2 + 0	3.0	S	

## 6. SEMESTER

Code	Course Name	Semester	T+P (Hours)	ECTS	C / E
MBG302	Biochemistry II	6	3 + 3	6.0	Z
Basic concepts of metabolism, catabolism and forming of phosphate bind energy, glycolysis, TCA-cycle, oxidative phosphorylation, oxidation of lipid acids and oxidative demolishing of amino acids, anabolism, photosynthesis, biosynthesis of carbohydrates, lipids, amino acids and nucleotides, biochemistry of membrane compounds, primer and secondary metabolites, carbohydrates metabolism, citric acid cycle and pentose phosphate pathway, electron transferring, nucleotide metabolism, amino acid metabolism, ammoniac metabolism and urea cycle, lipid metabolism, integration of metabolism.					
MBG308	Physiology II	6	3 + 0	4.0	Z
Homeostatic mechanisms, membrane potential, neuron physiology, central nervous system, peripheral nervous system, special senses, principle of endocrinology and endocrine organs, muscle physiology, control of body actions, the conscious and behavior					
MBG314	Molecular Genetics	6	3 + 0	4.0	Z
Gene and genome, molecular structure of genes, replication of genes, molecular basis of transcription and translation, recombination at molecular level, mutation and repair of DNA, repair mechanisms, molecular basis of protein synthesis, regulation of gene function in bacteria, organization of eukaryotic genomes and regulation of expression, transposons, phage genetics, gene cloning and manipulation, molecular genetics of development, cancer at molecular level.					
MBG320	Endocrinology	6	3 + 0	4.0	S
Definition of hormones, hormones, Classification, Hormonal control, mechanisms of action of hormones and receptors, Synthesis and Secretion of hormones, the pituitary gland and its hormones, Hormonal Control of Calcium Metabolism, Effects of hormones on different metabolisms, Thyroid Gland and Hormones, Pancreatic Hormones, Adrenal Sex Hormones, gastrointestinal All topics of hormone structure and Evaluation of the Lesson					
MBG324	Industrial Microbiology	6	3 + 0	4.0	S
Industrial microorganisms, microbial metabolism, fermentation media, pre-fermentation (upstream) processes, post fermentation (downstream) processes, industrial production of specific products and etc.					
MBG326	Chromosome Biology	6	3 + 0	4.0	S
General structure of chromosomes, Important parts of chromosomes, Chromosome analysis techniques, Chromosome abnormalities, Chromosomes in biotechnological applications, Toxicity tests related to chromosomes, using the karyotype program					
MBG328	Chromosomal Disorders	6	3 + 0	4.0	S
To learn basic clinic in genetic diseases, genotype-phenotype correlation, inheritance pattern in genetic diseases, terminology in human identifiable clinical patterns					
MBG330	Business English	6	3 + 0	4.0	Z
English grammar, dies, reading and evaluation of articles					
MBG332	Plant Molecular Biology	6	3 + 0	4.0	S
basic knowledge about plant genome, chloroplast genome and structure, mitochondria genome and structure, transcription in plant, translation in plant, PSII repair mechanisms translasyonal control, translasyonel control of ER signal, hormonal signal pathway and regulation					
MBG334	Genetics of Prokaryotes	6	3 + 0	4.0	Z
Principles of Molecular Biology, DNA, RNA, Replication, Transcription, Translation, Regulation of Genes, Mutation, Genetic Substance Transfer, Gene Cloning and Recombinant DNA Technology					
PFE302	Classroom Management (Pedagogic Formation)	6	2 + 0	3.0	S
Sınıf yönetimiyle ilgili temel kavramlar; sınıfın fiziksel, sosyal ve psikolojik boyutları; sınıf kuralları ve sınıfta disiplin; sınıf disiplini ve yönetimiyle ilgili modeller; sınıfta öğrenci davranışlarının yönetimi, sınıfta iletişim ve etkileşim süreci; sınıfta öğrenci motivasyonu; sınıfta zaman yönetimi; sınıfta bir öğretim lideri olarak öğretmen; öğretmen-veli görüşmelerinin yönetimi; olumlu sınıf ve öğrenme ikliminin oluşturulması; okul kademelerine göre sınıf yönetimiyle ilgili örnek olaylar.					
PFE304	Special Teaching Methods (Pedagogic Formation)	6	3 + 0	4.0	S

## 7. SEMESTER

Code	Course Name	Semester	T+P (Hours)	ECTS	C / E
İSL471	Entrepreneurship and Business Start-Up	7	3 + 0	5.0	S
The concept of entrepreneurship, entrepreneurship, economic, social and cultural foundations, entrepreneurial types, functions, processes, business plan.					
Code	Course Name	Semester	T+P (Hours)	ECTS	C / E
MBG338	Internship	7	0 + 2	5.0	S
Code	Course Name	Semester	T+P (Hours)	ECTS	C / E
MBG401	Applications in Molecular Biology I	7	0 + 4	6.0	Z
Research topic, literature research, methodical approaches and applications, experimental results and results evaluation					
Code	Course Name	Semester	T+P (Hours)	ECTS	C / E
MBG403	Recombinant DNA Technology	7	3 + 1	4.0	Z
Molecular Biology and Genetic Engineering, work with nucleic acids, equipments of genetic engineering, methodology of gene manipulation, host cells and vectors, cloning strategies, polymerase chain reaction, selection, identification and analyses of recombinants, understanding of genome and genes, genetic engineering and biotechnology, medical and medico-legal practices of gene manipulation, transgenic plant and animals.					
Code	Course Name	Semester	T+P (Hours)	ECTS	C / E
MBG407	Introduction to Bioinformatics	7	2 + 2	5.0	Z
Use of basic concepts of Molecular Biology with computer technology, DNA, RNA, Protein, Internet-based biological data banks and their use in the investigation of molecules. Use of programs of GeneTool and PepTool etc. used in molecular studies. Vertical array alignment, design, and evaluation of PCR primers, efficient use of gene banks in the world.					
Code	Course Name	Semester	T+P (Hours)	ECTS	C / E
MBG421	Molecular Technology	7	3 + 0	5.0	S
Molecular technology and Nano Technology, To built structures, materials and vehicles in atomic and molecular scale using special methods and techniques, this scale of measurement, estimation, monitoring, and make a construction activities; refers the ability to benefit from some basic features of this scale					
Code	Course Name	Semester	T+P (Hours)	ECTS	C / E
MBG423	Cancer Biology	7	3 + 0	5.0	S
Cancer Biology and Oncogenes, Some features of normal cell proliferation, Cell cycle control points, Cell immortality and Oncogenesis, Biology of Angiogenesis, Metastasis and Epithelial Mesenchymal Transition, Gene therapy in cancer, Current treatment methods in cancer					
Code	Course Name	Semester	T+P (Hours)	ECTS	C / E
MBG427	Immunology	7	3 + 0	5.0	S
To provide information about immune system cells, natural and acquired immunity, formation of the lymphocyte and antigen receptors , immune response and disruptions in the host defense mechanisms					
Code	Course Name	Semester	T+P (Hours)	ECTS	C / E
MBG429	Forensic Genetics	7	3 + 0	5.0	S
Single nucleotid polymorphism, hap map project, investigation of the forensic genetics cases, variable number of tandem repeats, restriction fragment length polymorphisms					
Code	Course Name	Semester	T+P (Hours)	ECTS	C / E
MBG431	Medical Microbiology	7	3 + 0	5.0	S
Prokaryotic organisms, Microbial cells, Cell surface components and virulence factors, Classification and laboratory diagnosis tools of pathogenic microorganisms, Immune system and escape from immune response, Microbiota and probiotics, Chemotherapeutic drugs, Vaccines, Mechanisms of action of antibiotics, Infectious diseases and their treatment.					
Code	Course Name	Semester	T+P (Hours)	ECTS	C / E
MBG433	Tissue Culture	7	3 + 0	5.0	S
Fundamental Definitions and Concepts; the Tissue Culture Laboratory, Necessary Equipment and Materials; Aseptic Techniques; Animal Tissue Culture Media; Primary Cell Cultures; Organization of the Cell Culture Room; General Techniques in Cell Culture: Identification of Cell Types, Culture Conditions; Cell Counting Methods, Seeding and Subculturing, Cell Preparation, Cell Freezing and Thawing; Methods Used to Determine Cell Viability and Cell Death; 2D and 3D Cell Cultures, Stem Cell Cultures					
Code	Course Name	Semester	T+P (Hours)	ECTS	C / E
MBG435	Evolutionary Biology	7	3 + 0	5.0	S
Micro and macro evolution, the origin of life, the concept of a common ancestor, evidence for evolution, the variation of living things through natural selection, the molecular dimension of evolution.					
Code	Course Name	Semester	T+P (Hours)	ECTS	C / E
MBG437	Ecotoxicology	7	3 + 0	5.0	S
Properties and classification of toxic substances, bioaccumulation concept, dose-concentration concepts, metal toxicity and bioremediation, detoxification and resistance mechanisms, molecular and physiological effects of toxic substances, antioxidant defense and oxidative stress.					
Code	Course Name	Semester	T+P (Hours)	ECTS	C / E
PFE401	Measurement and Evaluation in Education (Pedagogic Formation)	7	3 + 0	4.0	S
The importance of measurement and evaluation in education, basic concepts related to measurement and evaluation, measurement tools required qualities (reliability, validity, usability), and characteristics of measurement tools used in education, traditional tools (written exams, short-answer exams, true-false, multiple choice tests, matching tests, oral exams and assignments), familiarizing students (observation, interview, performance evaluation, portfolio, research papers, research projects, peer evaluation, self-assessment, attitude scales), basic statistical procedures on measurement results, evaluation of learning outcomes, grading, development of measurement tools related to the field.					
Code	Course Name	Semester	T+P (Hours)	ECTS	C / E
PFE403	Guidance and Special Education (Pedagogic Formation)	7	3 + 0	4.0	S
The place of guidance services in education; brief history of guidance; models and approaches regarding guidance; philosophy, purpose, principles and program of the developmental guidance model (comprehensive developmental guidance program); types of guidance (educational, vocational and personal guidance); the role and function of the teacher in classroom guidance; basic concepts related to special education; principles and historical development of special education; legal regulations regarding special education; screening, guidance, diagnosis and evaluation in special education; individualization of instruction; inclusion and support special education services; family involvement and cooperation in special education; Ethical principles in guidance and special education.					

## 8. SEMESTER

Code	Course Name	Semester	T+P (Hours)	ECTS	C / E
MBG402	Applications in Molecular Biology II	8	0 + 4	5.0	Z
Research topic, literature research, methodical approaches and applications, experimental results and results evaluation					
MBG404	Biotechnology	8	4 + 0	5.0	Z
Molecular Biotechnology of Biological Systems, Expression of foreign DNA in Prokaryotes and Eukaryotes, Transgenic Plants and Animals, Microbial Production of Therapeutic Agents, Vaccines, Genetically Modified Foods, Molecular Diagnosis of Inherited Diseases, Human Gene Therapy, DNA in Forensic Science, Regulating and Patenting Molecular Biotechnology.					
MBG408	Occupational Safety and Health II	8	3 + 0	3.0	Z
MBG410	Internship	8	0 + 2	5.0	Z
MBG420	Bioinformatics II	8	2 + 2	4.0	S
Gene Banks and the genome projects, the horizontal alignment of the overlapping set of sequences, phylogenetic analysis with molecular data, the estimated protein structure analysis					
MBG424	Stress Biology	8	3 + 0	4.0	S
What is Stress? Types of stress (drought, salt, heat, cold, frost, light, ultraviolet light, air pollutants and heavy metal stress), oxidative stress and oxidative stress tolerance mechanisms, conditions of stress tolerance mechanisms of plants and algae, free radicals					
MBG428	Animal Embryology	8	3 + 0	4.0	S
Embryonic development biology and principles. Gamete formation in living organisms: Oogenesis and spermatogenesis events. Properties of egg cell and sperm and activation of egg by fertilization. Examination of segmentation and segmentation types in different living groups. Gastrulation, development mechanisms and cell differentiation in various animals. Explanation of all stages of embryo development starting from cementation of fertilized egg cell in model organisms (in sponges, sea urchins, amphioxus, frogs, chickens, humans). Explanation of animal embryonic development stages on drawings and diagrams.					
MBG430	Plant Embryology	8	3 + 0	4.0	S
Parts of angiosperm flower, macro and microsporang, male and female gametophytes, pollination, fertilization, embryo, endosperma, seed and seed parts.					
MBG432	Virology	8	3 + 0	4.0	S
Structure of viruses, their properties, systematic criteria, laboratory diagnostic methods, production, viruses that cause disease in humans, respiratory system viruses, skin and mucous membrane viruses, nervous system viruses, sexually transmitted viruses, herpesviruses, hepatitis virus.					
MBG434	Stem Cell Biology	8	3 + 0	4.0	S
Stem cells and cell types, clinical applications, methods of obtaining stem cells					
MBG436	Signaling Pathways	8	3 + 0	4.0	S
cAMP (Cyclic Adenosine Mono Phosphate) Signal Metabolic pathway, cADP Ribose (Cyclic Adonozin Diphosphate Ribose, CADPR) and Nicotinic Acid Adenine Dinucleotide Phosphate (NAADP) signal metabolic pathway in Ca + 2 signaling, Voltage-operated channels, VOCs signal path, Receptor-operated channels (ROCs) signal path, signal pathway activating phospholipase C (PLC), PtdIns 3-kinase signal path activated by stimulation Nitric oxide (NO) / cGMP (Cyclic Guanozin Mono Phosphate) signaling metabolic pathway, Redox signal pathway, protein kinase (MAPK) signaling pathway activated by mitogens, Nuclear Factor -B (NF-FaktörB) signal metabolic pathway, Phospholipase D signaling metabolic pathway Sphingomyelin signal metabolic pathway JAK / STAT signaling metabolic pathway, Smad signal metabolic pathway Wnt signal metabolic pathway, Hedgehog signal metabolic pathway, Endoplasmic reticulum stress signaling pathway, AMP signal metabolic pathway.					
PFE402	Teaching Practice (Pedagogical Formation)	8	1 + 8	10.0	S