



LEFKE AVRUPA ÜNİVERSİTESİ
EUROPEAN UNIVERSITY OF LEFKE

**DEPARTMENT OF
MOLECULAR BIOLOGY & GENETICS**

PROGRAM INFORMATION

www.eul.edu.tr

PROGRAM INFORMATION

Program Name and Degree Awarded

Molecular Biology and Genetics / Undergraduate

Duration of Studies

4 years

Total Credits / ECTS

Total credits: 140

Total ECTS: 240

Language of Instruction

English

Mission and Vision

The mission of our department is to apply the knowledge gained in the field of Molecular Biology and Genetics to specialized areas within the department and interdisciplinary fields such as genetics, genomics, developmental biology, medical biology, biotechnology, synthetic biology, bioinformatics, molecular microbiology, and medical biochemistry, thereby building the foundation for future technologies and training molecular biologists, researchers, and scientists who are competent in using these technologies. Additionally, our department aims to train molecular biologists who embrace ethical values, are inclined toward interdisciplinary work, are curious about research, are entrepreneurial, and have adopted lifelong learning as a principle.

Our vision is to be a pioneering, innovative, and internationally recognized department in the field of molecular biology and genetics; to encourage interdisciplinary collaboration and make unique contributions to digital transformation and biotechnological innovations; and to shape the future

of society and the world through environmentally and socially conscious, sustainable scientific research.

Program Objectives

Our department's main goals are to thoroughly explore the molecular causes of diseases and to instruct students in human biology and genetics. In addition, it is planned to contribute to science by conducting training and research aimed at finding solutions to the problems caused by diseases, in line with the needs of our country. Our department contributes to the understanding of diseases and thus to the improvement of public health and social life by conducting researches together with other basic and medical sciences such as microbiology, biochemistry, bioinformatics, genetic engineering and cancer biology.

The Department of Molecular Biology and Genetics aims to train educators and researchers who can analyze conceptual and experimental problems using scientific methods and participate in innovative and pioneering research by offering our students education and research opportunities that meet global and European standards. Furthermore, one of our most important goals is to recruit individuals who embrace interdisciplinary approaches, possess high levels of curiosity and critical thinking skills, are proficient in new technologies, and have a sense of social and professional responsibility.

Program Learning Outcomes

- Possess sufficient knowledge in the field of molecular biology and genetics, and be able to apply theoretical knowledge and skills in this field,
- Identify, define and interpret problems in the field of Molecular Biology and Genetics,
- To be able to select and apply appropriate analysis and modelling methods to solve problems in the field of Molecular Biology and Genetics,
- To be able to effectively use information technologies for applications in Molecular Biology and Genetics,
- Designing and conducting experiments, collecting data, analysing and reporting results, troubleshooting and/or interpreting findings in the field of Molecular Biology and Genetics,

- To understand the universal and societal impacts of molecular biology and genetics applications (human health, environmental issues, economy, sustainability, etc.),
- Knowing the basic laboratory techniques in the field and being able to use laboratory instruments and equipment,
- To use computer-based information technologies, bioinformatics tools and biostatistics programs at the level required by the field,
- Possessing the theoretical and methodological knowledge required in the field and participating in interdisciplinary studies,
- Possessing sufficient awareness in the areas of quality management, environmental protection, scientific ethics, occupational health and safety,
- Be able to access and utilize original information sources related to the field using written, visual and social media tools,

Curriculum

MOLECULAR BIOLOGY AND GENETICS							
1st Semester				2nd Semester			
Course Code	Course Name	Credit	ECTS	Course Code	Course Name	Credit	ECTS
UHTC02	TURKISH	2	2	UHTC01	HISTORY	2	2
COMN111	CHEMISTRY	3	4	COMN114	BIOCHEMISTRY	3	4
MBGN113	BIOLOGY	3	6	UFLE02	FOREING LANGUAGE II	3	3
COMN121	PHYSICS I	3	4	MBGN102	INTRODUCTION TO MOLECULAR BIOLOGY AND GENETICS	3	6
ENGG111	CHEMISTRY LAB	1	2	MBGN104	MICROBIOLOGY	3	5
ENGG121	PHYSICS I LAB	1	2	UTE01	UNIVERSITY ELECTIVE I	3	5
UFLE01	FOREING LANGUAGE I	3	3	UPEC01	UNIVERSITY ELECTIVE (PHILISOPHY)	3	5
MATH101	CALCULUS	4	7				
		20	30			20	30
3th Semester				4th Semester			
MBGN201	HUMAN GENETICS	3	7	COMN103	PHYSIOLOGY	3	4
MBGN203	MOLECULAR CELL BIOLOGY I	4	7	COMN204	ETHICS IN PROFESSION	3	5
HSCC301	BIOSTATISTICS	3	5	MBGN204	MOLECULAR CELL BIOLOGY II	4	6
UFRC01	UNIVERSITY ELECTIVE I	3	4	UFRC02	UNIVERSITY ELECTIVE II	3	4
MBGN231	ORGANIC CHEMISTRY	4	7	MISY306	HUMAN FACTORS IN COMPUTING	3	6
				MBGN202	FIRST AID	3	5
		17	30			19	30
5th Semester				6th Semester			
MBGN301	MOLECULAR GENETICS	4	7	MBGN334	IMMUNOLOGY	3	6
MBGN303	BEHAVIORAL GENETICS	3	7	COMN352	RESEARCH METHODS	3	6
HSEL01	HEALTH SERVICES ELECTIVE I	3	5	MBGN302	BIOINFORMATICS	3	6
COMN253	STATISTICS	3	6	MBGN304	NEUROGENETICS	3	7
OSHE201	OCCUPATIONAL SAFETY AND HEALTH	3	5	HSEL02	HEALTH SERVICES ELECTIVE II	3	5
		16	30			15	30
7th Semester				8th Semester			
MBGN401	DEVELOPMENTAL BIOLOGY	4	7	MBGN404	BIOETHICS OF GENETICS AND GENOMICS	3	6
MBGN403	GENOMICS AND PROTEOMICS	3	6	MBGN410	GRADUATION PROJECT II	4	9
MBGN400	GRADUATION PROJECT I	1	2	AGEL04	TECHNICAL ELECTIVE IV	3	5
AGEL01	TECHNICAL ELECTIVE I	3	5	AGEL05	TECHNICAL ELECTIVE V	3	5
AGEL02	TECHNICAL ELECTIVE II	3	5	AGEL06	TECHNICAL ELECTIVE VI	3	5
AGEL03	TECHNICAL ELECTIVE III	3	5				
		17	30			16	30

Laboratory and Equipment Capacity (if applicable)

- Microscopes and Imaging Systems
- Centrifuges and Microcentrifuges
- Real-Time PCR Machine
- Gel Electrophoresis System
- Spectrophotometer
- Microplate Reader
- Incubators
- Biological Safety Cabinets
- Pipettes, Micropipettes and Pipettors
- Autoclave
- Laboratory Water Bath
- Refrigerators and Laboratory Freezers
- Vortex Mixers
- Test Tubes and Microcentrifuge Tubes
- Cell Culture Flasks
- Petri Dishes and Well Plates

Career Opportunities

Career options for Molecular Biology and Genetics graduates;

- Education and Research Hospitals
- Laboratories,
- Pharmaceutical Companies,
- Stem Cell Centers,
- Biotechnology Research Centers,
- IVF Centers,
- Health, Agriculture, Livestock and Environmental Organizations
- Universities (as a faculty member).

Contact Information

Head of the Department

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MOLECULAR BIOLOGY AND GENETICS

COURSE CATALOGUE DESCRIPTIONS

1st Semester

UFLE01 Foreign Language I

This course is intended for academically oriented students and it aims to bridge the gap between general and academic English. The course aims at developing the skills required for academic study, including note-taking, essay writing, as well as teaching strategies for undertaking research and dealing with unfamiliar academic vocabulary. The course also aims at teaching the features of guided writing, reading strategies such as predicting, skimming, and scanning. At the end of this course the students are expected to be able to; develop strategies, to improve the ability to comprehend complex academic texts, to develop strategies to produce more coherent writing and, make clear, appropriate, relevant notes from academic texts, and to adopt various approaches to deal with new or unknown vocabulary by practising effective use of dictionaries, and through making effective vocabulary records.

UHTC02 Turkish/Türkçe

To show the characteristics and rules of operation of Turkish language with examples; to give the students the ability and habit to express their feelings and thoughts accurately and effectively; developing vocabulary through written and oral texts; The aim of this course is to teach the rules of reading texts or the programs they listen to correctly. The course aims to provide basic Turkish reading, speaking and writing skills for international students.

Bu derste, yazı dilinin ve yazılı iletişimin temel özellikleri, yazı dili ile sözlü dilin arasındaki farklar, Yazılı ve sözlü anlatım; özne anlatım, nesnel anlatım, paragraf türleri, metnin tanımı ve metin türleri, yazılı anlatım, yazılı anlatım, planlı yazma aşamaları (konu, konunun sınırlandırılması, amaç, bakış açısı, ana ve yan düşüncelerin belirlenmesi, yazma planı hazırlama, kağıt düzeni) bilgilendirici metinler üzerinde kuramsal bilgiler: örnekler üzerinde çalışmalar ve yazma uygulamaları, bir metnin özetini ve planını çıkarma, yazılı uygulamalardaki dil ve anlatım yanlışlarını düzeltme ve sözlü anlatım uygulamaları işlenmektedir.

COMN111 Chemistry

The aim of this course is to describe students how substances interact with one another. Students will be informed on how the atom is made up, how atoms come together to make molecules and how molecules can interact, chemical compounds, chemical bonds, chemical equations and reactions, aqueous solutions, periodic table, gases, the electronic structure of the atom and introduction to thermochemistry.

COMN121 Physics I

This course aims to introduce the fundamental concepts of motion necessary for students of different disciplines and to provide essential background for their profession. The course provides deep understanding about kinematics and dynamics of one dimensional, two dimensional, circular and rotational motion. Also, the course aims to show the students applications of course material to different fields.

MBGN113 Biology

This course teaches the students the scope of biology, the structure and properties of organisms and the relation with the environment. Topics: Introduction to biology, Chemistry of life, classifications of living beings, properties of living things, kingdoms and general characteristics, organic and inorganic substances of living things, cell, cell and organelles, genetics, Tissues, organs and biological systems, Endocrine system, Nervous system.

ENGG111 Chemistry Lab

This course contains laboratory applications related with Chemistry course (COMN111). Experiments especially related with separation, stoichiometry, reactions in aqueous solutions, solution preparation and acids/bases are conducted.

ENGN121 Physics I Lab

This course is directed with ENGN131-Physics I. The aim of course is providing a medium for students to see the experimental applications of kinematics and dynamics of one dimensional, two dimensional, circular and rotational motion. The course supports students to validate the underlying theory through experiment and observation.

MATH101 Calculus

Fundamentals of calculus and its applications for engineers. The conceptual and visual representation of limits, continuity, differentiability, and tangent line approximations for functions at a point. Applying the power rule, product rule, quotient rule and chain rule to functions explicitly and implicitly for finding derivatives. Applying the fundamental theorem of calculus to evaluate definite integrals. Performing accurately improper integrals, definite and indefinite integration, and integration by parts, substitution, and inverse trigonometric substitution.

2nd Semester

COM100 Introduction to Computers

This course is an introductory course to computers and their application; the basic components of computers; Random Access Memory (RAM), Read Only Memory (ROM), Central Processing Unit (CPU) and relationship between these hardwares are introduced. Operating systems, application software (word processor, power point), Utility Software are introduced. Internet, network connections and the types, digital security and ethics are covered. Social networks and other web-based applications are introduced.

UHTC01 History/Tarih

The course provides a detailed exposure on the history of the construction of the Turkish Republic under the light of Kemal Atatürk's principles this course is designed for Turkish speaking students. The course is designed for non-Turkish speaking foreign students. The aim of the course is to introduce a brief history of Turkish Republic and Cyprus. Social, economic and political aspects and effects of Western Civilization on Turkey and Cyprus. Relations with Middle East.

Bu derste, Türk Ulusu'nun kurtarıcısı, Cumhuriyetin kurucusu, dünyanın en der yetiştirdiği asker ve devlet adamı, devrimci ve düşünür Atatürk'ün hayat hikayesinin yanı sıra, bir imparatorluğun çöküşü, Türk Ulusu'nun Atatürk'ün önderliğinde kahramanlık destanları yaratarak bağımsızlığını savunuşu, genç ve dinamik Türkiye Cumhuriyeti'nin kuruluşu ve bu Cumhuriyetin hızla yükselişi "Türk İnkılabı" adı verilen büyük atılım ve değişikliklerin ne kadar zamana sığdırıldığı ve bu inkılapların önemi vurgulanmakta ve Atatürk İlkeleri anlatılmaktadır.

UFLE02 Foreign Language II

This course is the continuation of the COM101 English I course. Similar issues are focused on as in the former course with a higher tone of language. This course integrates all four language skills and teaches students how to integrate skills and content in real-world academic contexts. High-interest and intellectually-simulating authentic materials are used to familiarize students with academic content. The course also aims at developing the ability to participate in exchanges of information and opinions in the context of the specific field, and to write

instructions, descriptions and explanations about topics in the related field. Extra importance is put on teaching student's terminology related to the specific field.

COMN114 Biochemistry

This course is designed to provide knowledge on the bodily functions of carbohydrates, proteins, fats, minerals and vitamins which involves introduction to fundamentals of biochemistry, organic and inorganic molecules, major metabolic pathways, energy metabolism and pathological cases concerning the human metabolism.

COM115 Sociology

The course makes an introduction to the discipline of sociology and provides an outline of the major sociologists, sociological paradigms and areas of sociological inquiry. It aims at developing students' awareness about the society in which they live, with a due emphasis on sociological perspective and sociology as a scientific discipline. Thus, the course helps the students to develop a sociological outlook and understand what such outlook retains in terms of the founding theories, main sociological approaches, and related discussions in those areas ranging from everyday life, culture and globalization to social stratification and mobility.

MBGN102 Introduction to Molecular Biology and Genetics

This course aims to transfer knowledge with basic competences related to molecular biology and genetics. The course begins with an understanding of the cell and cell structures and continues with an introduction to the properties of DNA as the carrier of genetic information in cells and the mechanisms by which it is maintained throughout cell generations. The synthesis and functions of basic biomolecules in the cell, energy transfer and the transfer of molecules can also be covered in this course. The course also provides information on the basic mechanisms by which the information encoded in DNA is transcribed into RNA and then translated into proteins as functional units.

MBGN104 Microbiology

This course aims to introduce microbiology to students. It will cover bacterial structure, physiology, growth, genetics, antibiotics and resistance mechanisms together with introduction to immunity, immune responses, serological tests, fungi, protozoa, helminths, and viruses. Moreover, in this course, it is aimed to gain sufficient knowledge and skills about the definition and history of microbiology, microorganism groups and their properties, microbial flora, sterilisation-disinfection, bacteria, fungi, viruses and parasites and the infections they cause.

UTEC01 University Elective I

UPEC01 University Elective (Philisophy)

3th Semester

MBGN201 Human Genetics

This course will introduce and teach fundamental principles in human genetics, providing a platform of knowledge for the rest of the course and enabling students to understand the basis of inheritance, variation and link with disease. In addition, it will cover hereditary and molecular genetics as it applies to humans, with a human disease perspective. The course covers a number of other related topics, including sex determination, the composition and function of genes, the causes and effects of mutation, population genetics, the genetics of

immunity and cancer, the contribution of heredity to behaviour and intelligence, genetic counselling, and genetic technologies.

MBGN203 Molecular Cell Biology I

In biological sciences, providing information about cell structures and functions at the molecular level is the main goal. The course focuses on the general architecture of cells, how cells generate protein products from stored genetic information and the key processes that define the life cycle of cells. Cell structure and function entails the study of the molecular mechanisms that regulate cell function. This course will provide students with an understanding of the molecules and complexes that make up cells and mediate cell activities.

HSCC301 Biostatistics

This course is designed to teach basic statistical knowledge and its use in health sciences. Students are expected to learn commonly used biostatistical techniques and use them in study design, data collection and interpretation of the findings.

MBGN231 Organic Chemistry

To provide the student with an understanding most important concepts related to functional groups, reaction mechanisms and isomerism in organic chemistry. The major aim of this course is to introduce students to the foundations of organic chemistry by focusing on the structures, properties and chemical reactivity of the various hybridization states carbon atoms can adopt in alkanes (including cycloalkanes), alkenes and alkynes. This course will also cover different aspects of isomerism observed in organic compounds as well as the reactions' mechanisms (substitution, elimination, and addition) in terms of the electrons flow. Furthermore, the second aim of this course The major aim of this course is to explore organic chemistry and to employ a prior knowledge in more advanced topics such as chemical and physical properties of dienes, aromatics, carbonyl compounds, carboxylic acids.

CFE201 Leadership and Management

In this course, an analysis of theoretical and practical knowledge is made. In this context, basic social and psychological factors associated with the concept of leadership and current theories will be explained and how theoretical knowledge can be applied in terms of leadership and management functions in organizations will be emphasized. The aim of the course is to provide students with a deep understanding of leadership and management concepts and to develop their own leadership skills.

4th Semester

COMN103 Physiology

The aim of the course is to describe the structures and understand the functional mechanisms which enable the human body to maintain a stable internal environment at rest, but which also allow the body to react to change. The subjects of the course include the potential challenges to homeostasis in the human body and the general adaptations used to overcome them, the function of neurones, brain and spinal cord in controlling the afferent and efferent divisions of the peripheral nervous system, the contraction mechanism of the muscles, the control of the circulation – cardiac output, the defence mechanisms of the body, the delivery of oxygen to the tissue and the

elimination of carbon dioxide from the body, digestion and absorption of food, the control of the production of the urine how fuel utilization and growth are regulated by the hormones and the principles of the reproduction.

COMN204 Ethics in Profession

The aim of this course is to define ethical principles, to enable students to develop ethical behaviours related to their profession, and to provide information about unethical behaviours that students may encounter in their professions. Within the context of the course, students will demonstrate an understanding of the ethical principles in general or in the application of specialized knowledge, results of research, creative expression, design processes, etc. that are related with their sciences, disciplines and potential professionals.

MBGN204 Molecular Cell Biology II

Regulation of gene expression is covered in detail. Also, details of transcription and translation are projected. Cell growth and specialization, interactions between the cells, gametes and fertilization, signal transmission ways are investigated. Cancer biology is introduced. Ageing and apoptosis are covered.

CFE202 Environment and Sustainable Development

This course provides information on nature and the environment along with sustainability concepts, as well as guides students to gain awareness about environmental problems. It aims to inform students about the daily practices that will lead to a more sustainable living. Additionally, knowledge about the global and social effects of all practices on health, environment, safety, and current issues related to the field of their area of study and awareness of the legal consequences of their specific area of practice to solutions are covered.

MBNG202 First Aid

The course emphasises on practical emergency skills. On completion the student will: be able to recognise life-threatening situations, be able to offer vital assistance before more experienced help arrives. Topics covered are Scene assessment, Safety, Chest pain (e.g. heart attack), Dislocations, how to use an AED (automated external defibrillator), Broken bones, Burns, Soft tissue injury, Asthma, Stroke, Seizures, Bleeding.

MISY306 Human Factors in Computing

5th Semester

COMP337 Database Management Systems

Foundations of a database-management system: view of data, data models, instances and schemas, data-definition and data-manipulation languages. Relational model: tables, tuples, attributes, primary and foreign keys, schema diagrams, relational algebra. Structured Query Language (SQL): built-in types, schema definitions, structure of an SQL query, queries on a single and multiple relations, as clause, string operations, ordering tuples, attribute specifications, where-clause predicates, set operations, null values, aggregate functions, aggregation with grouping, having clause, nested subqueries, set membership and comparison, test for empty relations and absence of duplicates, subqueries in the from-clause, with clause, scalar subqueries, modification of the database, join expressions, views, integrity constraints. Entity-Relationship (E-R) model: design process, entity sets,

relationship sets, complex attributes, mapping cardinalities, participation constraints, E-R diagrams, reducing E-R diagrams to relational schemas, extended E-R features, E-R design issues, alternative notations.

MBGN301 Molecular Genetics

The aim is to provide introduction to the basic principles of the molecular genetics and molecular biology of prokaryotic and eukaryotic organisms. This course gives students an in-depth understanding of how genetics, the study of mutations and their resulting phenotypes, are used to probe and understand a variety of biological phenomena ranging from metabolism to development, to cancer.

MBGN303 Behavioural Genetics

The aim of the module is to study the genetic basis of behavioural traits ranging from simple daily behaviours to pathological disorders. History of behavioural genetics, research techniques used within the field and real case study examples will be studied throughout the course. Effects of environmental factors will also be covered.

HTE451 Health and Technology

Within the scope of this course, technological developments in the field of health or science from the past to the present and what are the contributions of these developments to humanity will be covered. This course aims to learn the use of technological developments in the field of health.

OSHE201 Occupational Safety and Health

This course provided information on the theory and history of occupational health and safety, and enforcement of laws that address occupational safety and health globally. It also aims to guide students in understanding the roles and responsibilities of workers, unions and employers. This course also reviews other safety related issues and aspects of recognizing, evaluating, and understanding control of safety and health hazards in the workplace.

COMN253 Statistics

HSEL01 Health Services Elective I

6th Semester

MBGN334 Immunology

The aim of the module is to familiarize the students with the immune system and development of protective immune responses. Details of the innate and adaptive immunity and differences between the two concepts will be covered. Activation, proliferation and effector mechanisms of different immune cell types, generation of immunological memory and principles of vaccination will be covered. Development of autoimmune diseases and cancer immunology will also be covered throughout the course. In addition, techniques which are used for immunological research purposes such as western blot, ELISA, chromatography techniques and flow cytometry will be covered during the practical sessions.

COMN352 Research Methods

This course aims to provide students with conceptual and theoretical framework in research methods. The course tends to develop student skills in research and the ability to choose research topic, make critical literature review, decide on research approach, and select proper sample by using different aspects of qualitative and quantitative research methods.

MBGN302 Bioinformatics

Bioinformatics is a rapidly growing field that integrates molecular biology, statistics, and computer science. This course aims to provide students with information about the basic principles and application areas of bioinformatics and the tools used. The course gives a comprehensive entry-level introduction to bioinformatics. It covers two major goals are 1) to help students understand the scope, basic concepts and theory of bioinformatics; and 2) to become familiar with tools for bioinformatics-related data analysis. Additionally, this course includes topics such as pairwise alignment, sequence database searching, biological networks, network analysis and machine learning techniques. The course also provides an overview of the fundamentals of molecular biology, including genome and gene concepts, and includes an introduction to genome browsers and central biological databases.

MBGN304 Neurogenetics

The course will provide a deep understanding of gene and nervous system interaction. We will consider classic studies of simple invertebrate systems in which the genes for motor, sensory, and cognitive function were mapped and cloned, and move on to classic studies of mouse neurological mutants, to a consideration of human genetics and neurological disorders. The main focus will be on the mapping and identification of genes affecting brain function, behaviour, and human neurological disease.

HSC310 Human Behaviour and Communication

This course provides information on behaviour theories, relationships among sociology, anthropology and psychology, behavioural research methods and techniques, society, social structure, socialisation, social institutes, social mobility, urbanisation, population, language, communication, social behaviours and control, behavioural patterns, norms, traditions, social status, defence mechanisms, mental health and disorders, implementation fields of psychology.

HSEL02 Health Services Elective II

7th Semester

MBGN401 Developmental Biology

Developmental Biology course aims to study how complex multicellular organisms with different forms and cell types evolve from single cells. The course also covers the fundamentals of developmental biology in plants and animals with an emphasis on developmental genetics approaches that have connected specific genetic pathways to developmental traits. This course is designed to explore the fundamental concepts and mechanisms that regulate the wonder of animal development from fertilization of the egg to formation of the adult organism, including such topics as cycle of life, differential gene expression, cell-cell communication, fertilization, early

development, formation of germ layers (ectoderm, mesoderm, endoderm) and their derivatives, inductive cell/tissue interactions, stem cells, organogenesis, environment/genetics/birth defects, evolutionary changes and more.

MBGN403 Genomics and Proteomics

Genomics and proteomics have revolutionized biological research. It is now theoretically possible to fully characterize the structure, organization, regulation and interaction of all genes, proteins and small bioactive molecules in an organism. With the availability of genome sequences and high-throughput techniques, organismal physiology can now be examined on a global scale by monitoring the behavior of all genes or proteins in a single experiment. Genomics and Proteomics course will present modern techniques in genomics and proteomics, with particular focus on analyzing the data generated by these techniques. Course material will cover genomic sequencing, comparative sequence analysis, phylogeny construction and phylogenomics, transcription factor motif discovery, DNA microarray analysis, techniques in mass spectrometry, proteomic screening methods, and protein-interaction network analysis.

MBGN400 Graduation Project I

In this course, students will conduct an independent and interdisciplinary research on a topic of their interest under the supervision of an academic. Students will first formulate their research questions and hypotheses and submit a project proposal. They will then investigate their hypotheses by conducting literary and/or laboratory research. Students will regularly present their findings to their supervisor and other students in the course and will be prepared to discuss and defend their hypotheses and data. Upon completion of their research, students will write a report and share their final findings.

AGEL01 Technical Elective I (PHAR339 Pharmaceutical Biotechnology and Cell Culture)

This course covers introduction and basic principles of pharmaceutical biotechnology, importance of recombinant DNA technology, mechanisms and causes of protein destabilization, methods used to evaluate protein pharmaceuticals, biotechnology-based pharmaceuticals and formulation approaches to protein stabilization, advances in protein drug delivery, regulatory aspects of biotechnology-based pharmaceuticals, principles of cell culture, preparation, selection and maintenance of cell culture lines.

AGEL02 Technical Elective II (PSY307 Health Psychology)

The course introduces basic information about the subjects and theories in the field, psychological factors that play a role in health and disease processes. It emphasizes studies that contribute to the development of health. This course aims to introduce the basic concepts used in the field of health psychology. Research in the field of health psychology and health-threatening behaviors (such as smoking, poor nutrition, excessive alcohol consumption), the effects of stress on disease, ways of adapting to chronic diseases and ways of coping with terminal illnesses will be examined.

AGEL03 Technical Elective III (MBGN432 Cancer Biology and Genetics)

The content of the module aims to provide the students with an in depth understanding of various aspects of cancer development. The control and regulatory mechanisms that are in place under homeostatic conditions and how these are affected during cancer development are going to be covered throughout the module. Signalling mechanism changes during cancer development and how these could be potentially targeted as therapeutic

approaches will also be covered. Characteristic features of cancer cells and their ability to spread throughout the body will be studied to ensure the students understand the different stages of cancer development and how these can impact on the prognostic outcome for cancer patients. Students will also become familiar with cancer diagnosis, monitoring and conventional treatment approaches as well as resistance mechanisms that lead to cancer recurrence after treatment.

8th Semester

MBGN404 Bioethics of Genetics and Genomics

Ethics in genomics healthcare and research help those working in the field to negotiate ethical issues, promote consistency of approach and, ultimately, create better, more equitable experiences for patients and research participants. The primary focus of this course is to discover genetics from two perspectives: the scientific and ethical approach. We will be alternating between learning the science behind genetics and biotechnological advances with a philosophical and practical discussion of the ethics of these technologies. In addition, with this course, the ability to cope with ethical and legal problems that may be encountered in professional life will be gained.

MBGN410 Graduation Project II

In this course, students will conduct an independent and interdisciplinary research on a topic of their interest under the supervision of an academic. Students will first formulate their research questions and hypotheses and submit a project proposal. They will then investigate their hypotheses by conducting literary and/or laboratory research. Students will regularly present their findings to their supervisor and other students in the course and will be prepared to discuss and defend their hypotheses and data. Upon completion of their research, students will write a report and share their final findings.

AGEL04 Technical Elective IV (NDT208 Food Microbiology)

This course aims to provide instruction in the general principles of food microbiology. The course covers the biology and epidemiology of foodborne microorganisms of public health significance, including bacteria, yeasts, fungi, protozoa and viruses, and food spoilage microorganisms; the microbiology of food preservation and food commodities; fermented and microbial foods; principles and methods for the microbiological examination of foods; micro biological quality control, and quality schemes.

AGEL05 Technical Elective V (MBGN422 Biotechnology)

The content of this course is to define the definition, history and general concepts of medical biotechnology, basic biotechnological approaches, medical biotechnology, drug biotechnology, drug discovery and development, introduction to bioinformatics, gene technologies, innovative medicine, to give information about the current place and importance of medical biotechnology and to give examples of application processes as well as general information in their production areas.

AGEL06 Technical Elective VI