Program Records

About the Program	Bioengineering is an interdisciplinary field that basically aims to understand, modify or control medical systems by integrating material sciences and engineering. It fabricates the devices that helps the diagnosis and treatment of diseases and designs the products that provide the traceability of physiological functions. In other words, bioengineering applies basic science and engineering principles into life and living system through laboratory and aims to perform research that helps to elongate human lifetime and improves life quality. Bioengineering incorporates different fields. One of those fields is biomedical computing and screening which identifies biomaterials that are inspired by nature. Another subject that falls under biomedical engineering is the technology of biomedical devices that is involved in synthesizing artificial tissues in addition to "smart" drug carriers, sensory-chip systems for disease diagnosis and treatment and all assistant biomedical equipment that are involved in disease screening. Bioengineering also comprises the biosynthesis of animal and plant products. In addition to that, it is involved in cellular and molecular engineering and regenerative medicine, which deals with recombinant DNA technology, welfare and control of foods, development and control of new biotechnological products with high added value such as GMO.
Program Outcomes	Bioengineering graduates: 1. To provide original and innovative solutions for local and global problems through interdisciplinary education and research experience gained from basic sciences and engineering fields. 2. Take part in research and development projects in national and international organizations 3. Will be able to undertake the design, production and control of the products, as a researcher and entrepreneur.
Qualification Awarded	Master/Bioengineer
Length of Program & Credits	2years & 120 ECTS
Level of Qualification	Master; QF-EHEA: Level 2; EQF-LLL: Level 7
Mode of Study	Full Time
Field of Study	Natural Science-Engineering-Life Science
Admission Requirements	An undergraduate diploma; a passing or acceptable score from the English Proficiency Exam of Abdullah Gül University, YDS (Foreign Language Exam), YÖKDİL (Foreign Language Exam for Higher Education Institutions), or TOEFL; an acceptable score from the Academic Personnel and Postgraduate Education Entrance Exam (ALES - Mathematical Score Type); a passing score at the oral interview for the concerned Master's program. International students are admitted based on the criteria posted by the university.
Recognition of Credit Mobility	**Course Substitution:** For course substitutions, medium of instruction of a previous course must be English, its final grade must be at least 3.00 out of 4.00 and approval of a relevant University Board is required. **Lateral Transfer:** Spending at least one semester at the master's program currently enrolled in, taking at least 2 credit courses and passing them with at

	least 3.00 out of 4.00.
Graduation Requirements & Regulations	Successful completion of 7 Courses, Seminar and Ethics; a minimum grade point average (GPA) of 3.00; earning 120 ECTS credits; successful submission of a thesis.
Occupational Profiles of Graduates	Bioengineers can be employed in the industrial fields such as health care, medical devices, and drug research in different departments such as research and development, quality control and marketing besides academic career in universities.
Access to Further Studies	Graduates may apply to doctorate programs.
Assessment & Grading Policy	Based on Abdullah Gul University Undergraduate Education and Examination Regulation rules;

Letter Grade	Coefficient	Score	Status	Letter Grade	Status
A	4.00	90-100	Pass	NA	Not Attended
A-	3,67	87-89	Pass	W	Withdrawn
B+	3,33	83-86	Pass	I	Incomplete
B	3,00	80-82	Pass	T	Transferred
B-	2,67	77-79	Pass	S	Satisfactory
C+	2,33	73-76	Pass	U	Unsatisfactory
C	2,00	70-72	Pass	P	In Progress
C-	1,67	64-69	Conditional Pass	EX	Exempt
D+	1,33	56-63	Conditional Pass		
D	1,00	50-55	Conditional Pass		
F	0,00	0-49	Failed		

Program Outcomes

PO1-Ability to apply knowledge of mathematics, science and engineering.
PO2- The ability to have scientific and ethical values.
PO3- To solve unexpected and encountered problems in related applications.
PO4- To plan and manage activities required for professional development.
critically evaluate the accuracy and relevancy of knowledge and skills acquired;
PO5-To define and assess learning needs; and to direct learning processes.
PO6- Ability to identify, formulate, and solve complex engineering problems.
PO7- Share their opinions or solution offers to the problems to specialists or non-specialists, supporting these with qualitative and quantitative data.
PO8- Have enough competency in a foreign language to follow the literature in bioengineering and communicate with their peers
PO9- Use computer software and communication and information technologies required in the field of bioengineering competently and use these to access scientific resources
PO10- Comply with social, scientific and ethical values in the process of collecting, interpreting and using data and reporting the results in the field of bioengineering
PO11- Awareness of the environmental protection and work/laboratory safety.
PO12- Have the skills to work in interdisciplinary subjects
PO13- To have skills to use modern devices required for the practices.
PO14- Have competency in keeping up with global innovations and developments in bioengineering and in related fields.

TQF-HE & Program Outcomes Coverage

	Knowledge Theoretical Conceptual	**Skills** Cognitive Practical	**Competences** Work Independently and Take Responsibility	Learning	Communication And Social	Field Specific
P01	X		X	X		
PO2					X	
PO3	X		X			
PO4					X	X
PO5	X		X	X	X	
PO6				X		
PO7				X	X	
PO8		X	X			X
PO9	X	X		X		X
PO10					X	
PO11			X		X	
PO12	X	X	X			
PO13	X	X	X	X		
PO14		X		X		X

Institutional & Program Outcomes Coverage

	IO1	IO2	IO3	IO4	IO5	IO6	IO7
P01	X						
PO2	X	X					
PO3	X				X		
PO4	X				X		X
PO5					X		
PO6						X	
PO7					X		
PO8					X	X	X
PO9			X	X			
PO10			X				X
PO11	X				X		
PO12	X				X		
PO13	X				X		
PO14		X					

Code	**BENG504**
Name	**Advanced Molecular Biology**
Hour per week	3(3+0)
Credit	3
ECTS	7,5
Level/Year	Graduate / Anytime
Semester	Fall, Spring
Type	Elective
Prerequisites	-
Coordinator(s)	Asst. Prof. Dr. Sebiha Çevik Kaplan
Description	Includes basic principle of molecular biology at the advanced level for students with bioengineers/ biomedical/genetics background. This lecture will provide to student in depth knowledge of a specialized topic.This course covers following topics: DNA structure and function, RNA, protein, and also DNA replication, transcription and translation, chromosome structure and function, gene structure and function, regulation of genes in prokaryotes and in eukaryotes, DNA repair mechanism, DNA recombination, chromosome structure and function, chromatin and remodeling, posttranslational modification, cell cycle , mitosis, meiosis, control mechanism of cell cycle, cytoskeleton.

Code	**BENG 505**
Name	**Current Topics In Molecular Biology**
Hour per week	3 (3 + 0)
Credit	3
ECTS	7,5
Level/Year	Graduate / Anytime
Semester	Fall, Spring
Type	Elective
Prerequisites	---
Coordinator(s)	Asst. Prof. Dr. Mona El Khatib
Content	This course will provide students with the tools necessary to search, analyze, interpret and criticize the current topics in molecular biology. It provides a comprehensive knowledge of molecular biology. It also introduces the tools necessary to follow the recent advances in the field of molecular biology by gaining the ability to search the databases and scientifically criticize the recent literature. It is a platform where students can perform a scientific search and present the recent data scientifically. This course covers following topics: eukaryotic and prokaryotic cells, DNA replication, DNA repair mechanisms, Recombinant DNA Technology, chromosome structure, functions and aberrations, translation, post-translational modifications, chromatin and gene expression, gene regulation and silencing mechanisms, the cytoskeleton, cell-cell and cell- ECM interactions, cell signaling pathways and cell death mechanisms.

Code	**BENG506**
Name	**Bioinformatics**
Hour per week	3 (3 + 0)
Credit	3
ECTS	7,5
Level/Year	Graduate / Anytime
Semester	Fall and Spring
Type	Elective
Prerequisites	-
Coordinator (s)	Asst. Prof. Dr. Y. Zenmei Ohkubo
Content	This hands-on type course is designed to introduce the most important and basic concepts, methods, and tools used in bioinformatics. Topics include bioinformatics databases, sequence and structure alignment, homology search, protein folding, protein-protein interaction, protein structure prediction, molecular evolution, Monte Carlo simulation, and molecular dynamics. Upon completion of the course, the students should have the knowledge on the frontier of bioinformatics and be able to utilyze the bioinformatics tools for their research projects. This course covers the following topics: Cell and organelles; DNA, RNA and proteins; Data structure and algorithms; Machine learning and data mining; Sequence alignment; Motif Search; Structure prediction; MD simulation; Genetic linkage; Molecular evolution; DNA microarray; Molecular interaction network

Code	**BENG507**
Name	**Human Molecular Genetics**
Hour per week	3 (3+ 0)
Credit	3
ECTS	7,5
Level/Year	Graduate / Anytime
Semester	Fall, Spring
Type	Elective
Prerequisites	----
Coordinator(s)	Asst. Prof. Dr. Sebiha ÇEVİK-KAPLAN
Content	This lecture will introduce to students the basic concepts of human genetics at the molecular level. This course will also focus on single nucleotide polymorphism, genomics and sequence, regulation of gene expression in prokaryotes and eukaryotes. Moreover Human Molecular Genetics will encompass animal model for human diseases and genetic testing, gene therapy. This course covers the following topics: gene and heredity, mendelian genetics, pedigree analysis, genetics, human diseases, populations genetics, meiosis, gender determination, non-Mendelian genetics, mutations and recombination result in generating diversity

Code	**BENG508**
Name	**Advanced Cell Biology**
Hour per week	3(3 + 0)
Credit	3
ECTS	7,5
Level/Year	Graduate / Anytime
Semester	Fall, Spring
Type	Elective
Prerequisites	---
Coordinator(s)	Asst. Prof. Dr. Sebiha ÇEVİK-KAPLAN
Content	This course will also focus on control mechanism of cell, loss of mitochondrial function, apoptosis (cell death), diseases that are linked cell and cytoskeleton. The course includes exocytosis, endocytosis and secretion, motors in cell and cytoskeleton, extracellular matrix: its role, structure and function, cell migration and control mechanism. At the end of course, students will master the molecular bases of cell biology at the molecular level. The course will cover topics related to the cell; Cell, cell cycle, signaling, ECM, protein dynamics.

Code	**BENG 512**
Name	**Biotechnology and Biosafety**
Hour per week	3 (3 + 0)
Credit	3
ECTS	7,5
Level/Year	Graduate / Anytime
Semester	Fall, Spring
Type	Elective
Prerequisites	-
Coordinator(s)	Assist. Prof. Dr. Aysun CEBECI AYDIN
Content	The course aims to explain biosafety issues in biotechnology, biological risk assessment and management and information about preventive measures to students. Throughout the course students will learn about a broad understanding of the biotechnological fields and recent biotechnological problems and the solutions to these problems. The course covers biotechnology and biosafety, national and international agreements and protocols, risk analysis, bioethics, stem cell and cancer research, biological terrorism, accidents, management of biological waste and transfer of biological materials.

Code	**BENG 514**
Name	**Cancer Biology and Treatment**
Hour per week	3 (3 + 0)
Credit	3
ECTS	7,5
Level/Year	Graduate / Anytime
Semester	Fall, Spring
Type	Elective
Prerequisites	-
Coordinator(s)	Assist. Prof. Dr. Aysun ADAN
Content	The details of basic princibles of cancer development at the level of molecular and cell biology and how these basic concepts applied to cancer diagnosis and treatment will be covered. Current literature knowledge in this field will be discussed. The course covers the following topics: Carcinogenesis, cell cycle and regulation, oncogenes, tumor suppressor genes, angiogenesis, metastasis and invasion, multidrug resistance in cancer, interactions between tumor and its environment, cancer treatment strategies

Code	**BENG515**
Name	**Introduction to Tissue Engineering**
Hour per week	3 (3 + 0)
Credit	3
ECTS	7,5
Level/Year	Graduate / Anytime
Semester	Fall and Spring
Type	Elective
Prerequisites	-
Coordinator(s)	Asst. Prof. Dr. İsmail Alper İŞOĞLU
Content	Introduction to tissue engineering aims to teach the basic principles and components of tissue engineering, which are cells, tissue scaffolds and signal molecules. Students taking this course will have knowledge about the different applications of tissue engineering such as bone and cartilage tissue engineering, nerve tissue engineering, skin tissue engineering, and organ tissue engineering. They will also understand the strategies to apply tissue engineering products into clinical practices. This course covers the following topics: Definition of tissue engineering; Relationship of cell-scaffold-biosignal molecules; Scaffold properties; Cell selection and stem cell; In vitro culture; Products which are obtained by tissue engineering on the clinical phase or preclinical; Organ tissue engineering.

Code	**BENG517**
Name	**Polymeric Biomaterials**
Hour per week	3 (3 + 0)
Credit	3
ECTS	7,5
Level/Year	Graduate / Anytime
Semester	Fall and Spring
Type	Elective
Prerequisites	-
Coordinator(s)	Prof. Dr. Sevil DİNÇER İŞOĞLU
Content	This course focuses on description of polymers, properties and types of polymeric biomaterials, production and characterization methods of polymeric biomaterials and their application areas with different examples. Student will gain knowledge in general properties of polymers, polymer types that can be used in biomaterial production, synthesis, processing/fabrication and characterization. They will have ability to design polymer-based biomaterials according to the application areas in the body. This course will help students to improve themselves accessing to knowledge, using resources efficiently as well as preparation and presentation of projects. This course covers the following topics: General description of polymers, properties and types of polymeric biomaterials, production and characterization methods of polymeric biomaterials and their application areas with examples are aimed to be explained.

Code	**BENG518**
Name	**BIOMATERIALS**
Hour per week	3 (3 + 0)
Credit	3
ECTS	7,5
Level/Year	Graduate / Anytime
Semester	Fall and Spring
Type	Elective
Prerequisites	-
Coordinator(s)	Prof. Dr. Sevil DİNÇER İŞOĞLU
Content	The objective of this course is teaching students about general properties of biomaterials in different medical applications. Upon taking this course, students get knowledge about general concepts in materials science and learn material types and selection criteria as well as the way of interdisciplinary work. They can follow up-to-date topics during lectures. This course covers material types and characterizations, body response, biocompatibility issues and improvement strategies and application sites in the body such as soft and hard tissues.

Code	**BENG521**
Name	**Biomedical Electronics**
Hour per week	3 (3 + 0)
Credit	3
ECTS	7,5
Level/Year	Graduate / anytime
Semester	Fall
Type	Elective
Prerequisites	---
Coordinator(s)	Asst. Prof. Dr. Kutay İÇÖZ
Content	The fundamentals of circulation, neural and muscle systems and the origin of biological signals. Learning the transducers, and instrumentation circuitry will be covered.This course covers the following topics: Fundamentals of bioinstrumentation, sensors and transducers. Origins of bioelectric signals. Cardiac and neural anatomy and physiology basics. Biosignal types and their properties. Artifact removal from biosignals: Filtering and time and frequency domain filters. Information extraction from morphology of biosignals. Frequency characterization of biosignals. Blood pressure and sound. Measurement of flow and volume of blood. Measurements of the respiratory system. Medical imaging systems. Therapeutic and prosthetic devices. Electrical safety.

Code	**BENG524**
Name	**Material Design and Fabrication for Tissue Engineering**
Hour per week	3 (3 + 0)
Credit	3
ECTS	7,5
Level/Year	Graduate / Anytime
Semester	Fall and Spring
Type	Elective
Prerequisites	-
Coordinator(s)	Prof. Dr. Sevil DİNÇER İŞOĞLU, Asst. Prof. Dr. İsmail Alper İŞOĞLU
Content	This course aim at giving the following topics: desalination, gas foaming, and additive manufacturing with particle aggregation, freeze- drying, thermally induced phase separation and production of tissue scaffold with supercritical carbon dioxide. This course covers general introduction to tissue engineering, explanation of properties of tissue scaffold, comprehensive study of manufacturing methods of tissue scaffolds used in tissue engineering with the most recent studies in literature.

Code	**BENG525**
Name	**Instrumental Analysis**
Hour per week	3 (3 + 0)
Credit	3
ECTS	7,5
Level/Year	Graduate / Anytime
Semester	Fall and Spring
Type	Elective
Prerequisites	---
Coordinator(s)	Asst. Prof. Dr. İsmail Alper İŞOĞLU
Content	Instrumental Analysis focuses on instrumental techniques used for material characterization. Upon taking this course, students will learn principles of chemical measurements and gain a different point of view on solving problems based on devices. Instrumental analysis covers the following topic: separation methods, chromatographic techniques (i.e. GPC, HPLC), spectroscopy (UV spectrophotometer), visualization methods (SEM, TEM).

Code	**BENG526**
Name	**Basic Patent Principles in Science and Engineering**
Hour per Week	3(3+0)
credit	3
AKTS	7,5
Level/Year	Graduate/ Anytime
Semester	Fall/ Spring
Type	Elective
Prerequisities	---
Coordinator(s)	Asst. Prof. Dr. İsmail Alper İŞOĞLU
Description	This course aims at making students familiar with principles of intellectual property rights (IPR). Students will be able to search patents data bases, to read and understand a patent application, to prepare claim drafting. This course covers following topics: trademark, industrial design, copyrights and related rights, patent search, claim drafting, economical value of IP

Code	**BENG530**
Name	**Basic Engineering for Bioengineers**
Hour per week	3 (3 + 0)
Credit	3
ECTS	7,5
Level/Year	Graduate / Anytime
Semester	Fall
Type	Elective
Prerequisites	---
Coordinator(s)	Asst. Prof. Dr. İsmail Alper İŞOĞLU
Content	The aim is to become familiar with the fundamental principles of engineering and to be able to use these principles in the related research fields. This course covers following topic: the fundamental principles of engineering, calculation based on engineering, mass and energy equations, fluid mechanics in the process engineering, the principle and applications of heat and mass transfer, the fundamental of reaction engineering and homogeneous and heterogeneous reactor.

Code	**BENG535**
Name	**Molecular & Statistical Mechanics**
Hour per week	3 (3 + 0)
Credit	3
ECTS	7,5
Level/Year	Graduate / Anytime
Semester	Fall and Spring
Type	Elective
Prerequisites	-
Coordinator(s)	Asst. Prof. Dr. Y. Zenmei OHKUBO
Content	This course is intended to provide non-physics majors with the theories in statistical mechanics and their applications to molecular systems in biology. The course also introduces state-of-the-art computer simulation methodologies for studying energetics and dynamics of biological macromolecules. Upon completion of the course, students should be able to account for statistical mechanical description of biological systems and use computational methods. This course covers the following topics: the laws of thermodynamics, ensembles, perturbation theory, linear response theory, spectroscopy, free energies, Monte Carlo simulations and molecular dynamics.

Code	**BENG536**
Name	**Linux for Scientific Research**
Hour per week	3 (3 + 0)
Credit	3
ECTS	7,5
Level/Year	Graduate / Anytime
Semester	Fall and Spring
Type	Elective
Prerequisites	-
Coordinator(s)	Asst. Prof. Dr. Y. Zenmei OHKUBO
Content	Linux is a computer operating system that appears in many different architectures: mainframes, servers, desktops, and laptops. Researchers in any fields may encounter a situation in which Linux knowledge is required to pursue their studies. This course is primarily designed for would-be users of Linux. Upon completion of the course, students should be intermediate-level Linux users who possess a good working knowledge of Linux and can keep develping their Linux knowledge and skills by themselves. Topics include common Linux commands, bash shell, user environment, editors (vim and emacs), filters (grep, sed, and awk), document-preparation tools (LaTeX, cvs, and make).

Code	**BENG 537**
Name	**Stem Cells**
Hour per week	3 (3 + 0)
Credit	3
ECTS	7,5
Level/Year	Graduate / Anytime
Semester	Fall, Spring
Type	Elective
Prerequisites	---
Coordinator(s)	Asst. Prof. Dr. Mona El KHATIB
Content	This course will introduce a broad range of topics related to stem cell biology. It will present stem cells in relation to many aspects of basic and applied biology and medicine including development, regeneration/repair, and cancer. The course will cover the following concepts and themes: pluripotency and reprogramming, pluripotent cell types, organ systems, stem cells and cancer, therapeutics and ethics.

Code	**BENG 538**
Name	**Biological Sciences for Bioengineers**
Hour per week	3 (3 + 0)
Credit	3
ECTS	7,5
Level/Year	Graduate / Anytime
Semester	Fall, Spring
Type	Elective
Prerequisites	----
Coordinator(s)	Asst. Prof. Dr. Mona El KHATIB
Content	It is an introduction to definitions and principles of different biological processes. Bioengineering students who take that course will be equipped with the basic biological principles to be able to conduct their research. This course covers following topics: cell, central Dogma, cellular interactions, DNA synthesis and replication, transcription, translation, protein structure and modification, helix coil transition, cell-cell and cell-ECM interactions, cytoskeleton, cell signaling, genetics and epigenetics, biochemistry and molecular modeling.

Code	**BENG 539**
Name	**Nanocarriers and Drug Delivery**
Hour per week	3 (3+0)
Credit	3
ECTS	7,5
Level/Year	Graduate / Anytime
Semester	Fall/Spring
Type	Elective
Prerequisites	---
Coordinator(s)	Asst. Prof. Dr. Erkin AYDIN
Content	Nanotechnology approaches towards drug delivery and types, characteristics, and in vivo behavior of nanocarrier systems will be introduced. Topics to be covered include definition of drug delivery; nanocarrier design, characterization, and types; lipid, inorganic, polymer based nanocarriers, and viruses; nanoparticles in monitoring, targeting, biodistribution studies, EPR effect, toxicity, examples from preclinical and clinical stage formulations.

Code	**BENG540**
Name	**Neuron Dynamics**
Hour per week	3 (3 + 0)
Credit	3
ECTS	7,5
Level/Year	Graduate / anytime
Semester	Fall
Type	Elective
Prerequisites	-
Coordinator(s)	Assoc. Prof. Dr. Sergey BORISENOK
Content	This course provides an opportunity for students to: 1. learn the basic principles of hierarchic modeling of human brain; 2. learn the modeling of single neuron providing the realistic analysis of its spiking and bursting; 3. learn the modeling of neural clusters and their topological features; 4. learn the basic methods of quantitative analysis of electroencephalography and brain imaging; 5. learn the usage of basic computer tools for the brain dynamics modeling; learn the basic concepts of nonlinear dynamics mathematical modeling for human brain. This course covers the following topics: Simple neuron model, Hodgkin-Huxley models and biophysical modeling. Two-dimensional models and phase plane analysis. Two-dimensional models. Variability of spike trains and the neural code. Noise models, noisy neurons and coding. Estimating neuron models for coding and decoding.

Code	**BENG541**
Name	**Molecular Cell Biology for Engineers**
Hour per week	3 (3 + 0)
Credit	3
ECTS	7,5
Level/Year	Graduate / Anytime
Semester	Fall and Spring
Type	Elective
Prerequisites	---
Cordinatoor(s)	Asst. Prof. Dr. AYSUN ADAN
Content	Basic principles of molecular cell biology and common research methods will be introduced and how to apply these approaches to the field of interest for students with bioengineers/ biomedical background. Topic to be covered include the basic principles of cell biology, molecular biology and genetic engineering for students with bioengineers/ biomedical background: Organelles, cytoskeleton, DNA replication, transcription, translation, regulation gene expression, cell membrane and transport, cell-cell interactions, cell signaling, recombinant DNA technology, molecular modelling

Code	**BENG542**
Name	**Molecular Basis of Disease**
Hour per week	3 (3 + 0)
Credit	3
ECTS	7,5
Level/Year	Graduate / Anytime
Semester	Fall
Type	Elective
Prerequisites	Genetics
Coordinator(s)	Asst. Prof. Dr. Oktay Ismail KAPLAN
Content	The main aim of this course is to provide an insight into the molecular mechanisms underlying human disease processes and help the development of targeted therapies and drugs. This graduate level class will provide an opportunity for students to learn genetics and biochemical processes leading to a range of diseases including neurodegenerative diseases like Alzheimer's and Parkinson's diseases; complex diseases like diabetes and atherosclerosis; lysosomal diseases caused by enzyme deficiency; mitochondrial diseases, muscle diseases and autoimmune diseases.

Code	**BENG 543**
Name	**Computational Biology**
Hour per week	3+0 (Theory + Practice)
Credit	3
ECTS	7,5
Level/Year	Graduate
Semester	Fall, Spring
Type	Elective
Prerequisites	-
Special Conditions	Students should bring their laptop computers
Coordinator(s)	Yoshiaki Zenmei Ohkubo
Content	To build a solid background of computational biology, mathematical principles and algorithms will be discussed. This course covers the following topics: Linux basics, molecular biology, biological databases, sequence alignments, structure alignments, protein structure prediction, molecular modeling and visualization, molecular dynamics, search algorithms, statistical thermodynamics, and statistical analysis of biological data.

Code	**BENG544**
Name	**Neuroscience**
Hour per week	3 (3 + 0)
Credit	3
ECTS	7,5
Level/Year	Graduate / Anytime
Semester	
Type	Elective
Prerequisites	---
Coordinator(s)	Asst. Prof. Dr. Oktay İsmail KAPLAN
Content	The main aim of this course is to provide an insight into neuroscience at the molecular and cellular level. The course will introduce the mammalian nervous system to the students. Neurons are highly specialized cells that relay the information to other neurons through chemical and electrical signals. Chemical synaptic transmission and the neurotransmitters will be discussed in the lectures. This course covers the following topics: Human Neuroanatomy, Neurons, Neuron structure, Neuron types and Glia, Chemicals and Ions, The action potantial, axon and dendrite, Taste and Smell, The structure of Eye, the structure of the auditory system, The Hypothalamus, Memory, The Amygdala and Aggression, Sleep: Neural Mechanisms of Sleep, Biological Clocks, Mental Illness

Code	**BENG545**
Name	**Protein Expression and Purification**
Hour per week	3 (3 + 0)
Credit	3
ECTS	7,5
Level/Year	Graduate / Anytime
Semester	Fall / Spring
Type	Elective
Prerequisites	-------
Coordinator(s)	Asst. Prof. Dr. Emel Başak GENCER AKÇOK
Content	This course aim at • Evaluating pros and cons of variety of protein expression systems • Learning basic principles of protein extraction and quantification methods • Showing outline chromatography methods • Designing protein purification strategy This course covers the following topics: Overview of bacterial and eukaryotic protein expression systems and protein extraction methods from different sources; Principles of protein purification methods such as precipitation, centrifugation, electrophoresis, liquid chromatography and affinity enrichment.

Code	**BENG546**
Name	**Data Mining**
Hour per week	3 (3 + 0)
Credit	3
ECTS	7,5
Level/Year	Graduate
Semester	Fall/Spring
Type	Elective
Prerequisites	
Coordinator(s)	Assist. Prof. Dr. Müşerref Duygu Saçar Demirci
Content	The course presents an introduction to popular data mining approaches. Through a course project, the students will apply a data mining software on a real problem. The key processes in data mining will be covered: types of attributes, common data set structures, data preprocessing, feature selection, sampling, using different statistical and machine learning techniques and visualization.