

FACULTY OF SCIENCE

The Faculty of Science was established as a result of the restructuring in 1993, and was affiliated to Eskişehir Technical University, which was established with the Law No. 7141 published in the Official Gazette No. 30425 dated May 18, 2018 with all its infrastructure and staff. Biology English, Physics, Statistics (30% in English), Chemistry (30% in English) and Mathematics Programs are conducted in the Faculty of Science and these programs are four-year (8 semesters) programs. Four-year undergraduate education and training activities are carried out in the departments of Biology, Physics, Statistics, Chemistry and Mathematics. 30% English education is applied in Chemistry and Statistics Programs. English preparatory education for one year has been started by opening interdisciplinary Business Analytics, CBRN and Nanoscience Minor Programs with the 2021-2022 Academic year; It is also wanted to expand the opportunities for students to benefit from foreign resources by supporting Advanced English courses and optional English-taught branch courses during undergraduate education. In addition to branch courses, elective courses with social and cultural content are also offered, thus it is aimed to expand students' perspectives through courses offered on different subjects in addition to their areas of expertise. Our aim is to provide expertise to our students by teaching education in laboratories and classrooms equipped with advanced technology in the light of the basic elements of science, as well as to enable them to grow up as Atatürkist, contemporary, creative, rational, self-confident, questioning researcher individuals.

Dean	: Prof. Dr. İlhami ÇELİK
Vice-Dean	: Assoc. Prof. Dr. Şükrü ACITAŞ
Vice-Dean	: Asst. Prof. Dr. Seçil ŞENTORUN
Secretary to the Faculty	: Ayfer OLCAY

STAFF

Professors:

Meryem AKBELEN, Emrah AKYAR, Handan AKYAR, Filiz ALANYALI, Ferhat ALTUNSOY, Hülya ALTUNTAŞ, Özgür ALVER, Muhittin ARSLANYOLU, Ahmet Şenol AYBEK, Hüseyin AZCAN, Şenay BULUT, Taner BÜYÜKKÖROĞLU, Mehmet CANDAN, Hakan CEBECİ, Müjdat ÇAĞLAR, Yasemin ÇAĞLAR, İlhami ÇELİK, Nedim DEĞİRMENCİ, Bünyamin DEMİR, Süleyman DEMİR, Rasime DEMİREL, Ali DENİZ, Yılmaz DERELİ, Sedef DİKMEN, Sibel DİLTEMİZ, Serkan Ali DÜZCE, Nihal EGE, Barış ERBAŞ, Murat ERDEM, Burcu ERDOĞAN, Arzu ERSÖZ, Kıymet GÜVEN, Tülay HURMA, Deniz HÜR, Betül KAN KILINÇ, İbrahim KANI, Abidin KILIÇ, Metin KUL, Nihal KUŞ, H. Mehtap KUTLU, Murat LIMONCU, Yeliz MERT KANTAR, Yasemin MUTLU, M. Burçin MUTLU, Ali ÖZCAN, Adnan ÖZCAN, Asiye Safa ÖZCAN, Ayça ÖZCAN, Nülfir ÖZDEMİR, Yunus ÖZDEMİR, Elif ÖZTETİK, Uğur SERİNCAN, Emel SÖZEN, Sevil ŞENTÜRK, Figen TAKIL MUTLU, Murat TANIŞLI, Engin TIRAŞ, Evren TURAN, Cengiz TÜRE, Berrin TÜYLÜ, İlhan USTA, Ülkü Dilek UYSAL, Elif YAMAÇ, Berna YAZICI, Filiz YILMAZ, Meral YILMAZ CANKILIÇ, Nalan YILMAZ SARIÖZLÜ, Cem YÜCE, Ersin YÜCEL

Associate Professors:

Şükrü ACITAŞ, Sabiha AKSAY, Şirin AKTAY, Zerrin AŞAN, İlker AVAN, Özlem BİÇEN ÜNLÜER, Harun BÖCÜK, Nuray CANDEMİR, Derya ÇELİK, Nezahat ÇETİN, Yasemin DEMİRCİOĞLU, Bilge ERDEM, Utku ERDOĞAN, Emel ERGENE, Emel ERMİŞ, Nesil ERTORUN, Özer GÖK, Gülçin IŞIK, Ertuğrul İZCİ, Bahar KARAMAN, Nazmiye KERVAN, Volkan KILIÇ, Gözde KILIÇ, Mustafa KULAKCI, Elif Mine ÖNCÜ KAYA, Özer ÖZDEMİR, Recep Sulhi ÖZKÜTÜK, Züleyha ÖZTAŞ, Kadir Özgür PEKER, Mustafa SALTAN, Neslihan ŞAHİN, Hakan ÜNVER, Adem Ersin ÜREYEN

Faculty Members:

Metin ALTAN, Burcu ARPAPAY, Nisa ASLAN, Türkay AYTEKİN AYDIN, Özge BAĞLAYAN, Alper BEKKİ, Hüseyin BERBER, Halil BERBER, Mustafa ÇAVUŞ, Zafer DİKMEN, Dilek ELMALI, Oğuz ERTUĞRUL, Halil GAMSIZKAN, Sultan Funda GÖRKEM, İlknur GÜVENÇ, H. Açelya KAPKAÇ, Fatma Diğdem KOPARAL, Seçil ŞENTORUN, Levent TERLEMEZ, Didem TOZKAN, İsmail YENİLMEZ

Lecturer Doctor

Caner AYDINLI, Halil ERYILMAZ, Çiğdem KALATHILPARMBİL, Züliyet ÇELİKBİLEK, Tülay TOLAN

Lecturers:

Erdoğan ÇAKIR, Belma DEĞİRMENCİ, Tülay TIRAŞ,

Research Assistants:

Emre AKDOĞAN, Burak ARATAN, Burak BERBER, Samet BİLA, Gökçe ÇAKMAK, Arsen DEMİROĞLU, Mehmet ERGEN, Orkun ERGÜRHAN, Hanefi Gezer, Hatice GÜNEY, Cenk İÇÖZ, Erhan İLTER, Pınar KAPÇI, Merve KESKİNOĞLU İNCE, Simay Yağmur KÖKEN, Edanur TAŞTAN BERBER, Ayşe TORUN, Gizem TUTAR, Seyfettin TÜRK, Mustafa UZUN, Dilek YALÇIN, Emrullah YILMAZ, Kübranur YILMAZ

DEPARTMENT OF BIOLOGY

The Department of Biology consists of six departments: General Biology, Zoology, Botany, Ecology, Molecular Biology and Basic and Industrial Microbiology. The science of biology, which aims to understand living creatures and living systems, is divided into many sub-branches in terms of research topics. The laboratories in our department have the appropriate infrastructure and technological equipment to enable students to make practical applications related to the courses, as well as to conduct advanced research studies. Projects supported by the biology department faculty members, Eskişehir Technical University, TÜBİTAK and TÜSEB are carried out with the participation of students, and collaborations are maintained with universities, research laboratories and centers at the national and international levels. Dec. Graduates of the Department of Biology can work in the academic staff of universities. In addition, they can find job opportunities in laboratories affiliated to health institutions, private research institutes, organizations affiliated to the Ministry of Agriculture, Forestry and Environment, food and pharmaceutical industries. Graduates who have the necessary certificate can teach in private or public schools. The department cooperates with various international universities, research laboratories and centers.

Department Head	: Prof. Dr. Mehmet CANDAN
Deputy Department Head	: Prof. Dr. Meral YILMAZ CANKILIÇ
Deputy Department Head	: Asst. Prof. Dr. H. Açelya KAPKAÇ

PROGRAM

I.Semester				II.Semester			
BİY 103	Biomathematics	3+0	3,0	BİY 104	Biophysics	3+0	4,0
BİY 117	General Biology I	4+0	6,0	BİY 118	General Biology II	4+0	6,0
BİY 119	General Biology Laboratory I	0+4	3,0	BİY 120	General Biology Laboratory II	0+4	3,0
EKİM 103	General Chemistry	4+0	4,0	BİY108	Biophysics Laboratory	0+2	3,0
İSG 401	Occupational Health and Safety I	2+0	2,0	İSG 402	Occupational Health and Safety II	2+0	2,0
JEO 101	General Geology	2+0	2,0	İST 209	Biostatistics	3+0	3,0
KİM 131	General Chemistry Laboratory	0+2	2,0	KİM 208	Organic Chemistry	3+0	4,0
TÜR 125	Turkish Language I	2+0	2,0	TÜR 126	Turkish Language II	2+0	2,0
	Foreign Language Courses		3,0		Foreign Language Courses		3,0
	Elective Courses		3,0				
			<u>30,0</u>				<u>30,0</u>

III.Semester				IV.Semester			
BİY 213	Cryptogams	2+0	2,5	BİY 216	Microbiology II	2+0	2,5
BİY 215	Microbiology I	2+0	2,5	BİY 218	Microbiology Laboratory II	0+2	2,0
BİY 217	Microbiology Laboratory I	0+2	2,0	BİY 220	Seed Plants	2+0	3,0
BİY 219	Cryptogams Laboratory	0+2	2,0	BİY 222	Seed Plants Laboratory	0+2	2,0
BİY 221	Plant Morphology	2+0	2,5	BİY 224	Vertabrate Animals	2+0	2,5

BiY 223	Plant Morphology Laboratory	0+2	2,0	BiY 226	Vertabrate Animals Laboratory	0+2	2,0
BiY 225	Cytology	2+0	2,0	BiY 228	Arthropoda	2+0	2,5
BiY 227	Cytology Laboratory	0+2	2,0	BiY 230	Arthropods Laboratory	0+2	2,0
BiY 229	Invertabrate Animals	2+0	2,5	BiY 232	General Ecology	2+0	3,0
BiY 231	Invertabrate Animals Laboratory	0+2	2,0	BiY 234	General Ecology Laboratory	0+2	2,0
BiY 239	Molecular Biology	2+0	2,0	TAR 166	Atatürk's Principles and History of Turkish Revolution II	2+0	2,0
BiY 241	Molecular Biology Laboratory	0+2	2,0		Elective Courses		4,5
TAR 165	Atatürk's Principles and History of Turkish Revolution I	2+0	2,0				
	Elective Courses		2,0				
			<hr/>				<hr/>
			30,0				30,0

V.Semester

BiY 305	Molecular Cell Physiology	2+0	2,5
BiY 339	Physiology of Animals	2+0	2,5
BiY 341	Physiology Laboratory of Animals	0+2	2,0
BiY 371	Biotechnology	2+0	2,5
BiY 373	Biotechnology Laboratory	0+2	2,0
BiY 395	Biochemistry I	2+0	2,5
BiY 397	Biochemistry Laboratory I	0+2	2,0
BiYSJ 301	Internship	0+2	5,0
	Area Elective Courses		9,0
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			30,0

VII.Semester

BiY 405	Developmental Biology I	2+0	3,0
BiY 412	Plant Geography	2+0	3,0
BiY 414	Zoogeography	2+0	3,0
BiY 457	Molecular Genetics	2+0	3,0
BiY 489	Graduation Project I	0+4	7,0
	Area Elective Courses		9,0
	Elective Courses		2,0
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			30,0

VI.Semester

BiY 354	Plant Physiology	2+0	2,5
BiY 356	Plant Physiology Laboratory	0+2	2,0
BiY 358	Genetics	2+0	2,5
BiY 360	Genetic Laboratory	0+2	2,0
BiY 396	Biochemistry II	2+0	2,5
BiY 398	Biochemistry Laboratory II	0+2	2,0
	Area Elective Courses		13,5
	Elective Courses		3,0
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			30,0

VIII.Semester

BiY 402	The Evolution	2+0	3,0
BiY 404	Human Biology	2+0	3,0
BiY 406	Developmental Biology II	2+0	3,0
BiY 490	Graduation Project II	0+4	7,0
	Area Elective Courses		14,0
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			30,0

Area Elective Courses

BiY 306	Medical Entomology	2+0	4,0	BiY 421	(Eng.) Molecular Biology of Development	2+0	4,0
BiY 313	Endocrinology	2+0	4,0	BiY 424	Biology of Cancer	2+0	4,0
BiY 316	Mycology	2+0	4,0	BiY 426	General Parasitology	2+0	4,0
BiY 317	Insect Ecology	2+0	4,0	BiY 427	Cosmetics Microbiology	2+0	4,0
BiY 318	Enzymology	2+0	4,0	BiY 430	Genetic Toxicology	2+0	4,0
BiY 319	Biodiversity and Flora of Turkey	2+0	4,0	BiY 431	Introductory Bioinformatics	2+0	4,0
BiY 326	Paleontology	2+0	4,0	BiY 433	Plant Genetic Engineering	2+0	4,0
BiY 328	Endocrinology	2+0	4,0	BiY 433	(Eng.) Plant Genetic Engineering	2+0	4,0

BiY 329	Environmental Impact Assessment	2+0	4,0	BiY 434	Plant Biotechnology	2+0	4,0
BiY 330	Techniques in Systematic Botany	2+0	4,0	BiY 435	Hydrobotany	2+0	4,0
BiY 334	Biological Control	2+0	4,0	BiY 436	Ethnobotanic	2+0	4,0
BiY 336	Ornithology	2+0	4,0	BiY 439	Microbial Biotechnology	2+0	4,0
BiY 343	Hydrobiology	2+0	4,0	BiY 440	Animal Toxins	2+0	4,0
BiY 352	Introduction to Lichenology	2+0	4,0	BiY 445	Biological Anthropology	2+0	4,0
BiY 367	Microorganisms and Energy	2+0	4,0	BiY 451	Diagnostic Microbiology	2+0	4,0
BiY 369	Medical Plants	2+0	4,0	BiY 455	Microbial Physiology	2+0	4,0
BiY 374	Immunology	2+0	4,0	BiY 462	Actinomycetes and Antibiotics of Actinomycetes	2+0	4,0
BiY 375	Forensic Biology	2+0	4,0	BiY 465	Clinical Biochemistry	2+0	4,0
BiY 376	Virology	2+0	4,0	BiY 467	(Eng.) Conservation Biology	2+0	4,0
BiY 377	Foodborne Pathogenic Microorganisms	0+3	5,0	BiY 468	Oxidative Stress and Antioxidants	2+0	4,0
BiY 378	Statistical Applications in Biology	2+0	4,0	BiY 468	(Eng.) Oxidative Stress and Antioxidants	2+0	4,0
BiY 379	Histology	0+3	5,0	BiY 469	Forensic Entomology	2+0	4,0
BiY 383	Microbial Techniques	0+3	5,0	BiY 470	Environmental Biology	2+0	4,0
BiY 384	Plant Ecology	2+0	4,0	BiY 471	Molecular Microbial Ecology	0+3	5,0
BiY 385	Comparative Anatomy and Morphology of Animals	2+0	4,0	BiY 471	(Eng.) Molecular Microbial Ecology	0+3	5,0
BiY 386	Microbial Ecology	2+0	4,0	BiY 472	Nutritional Biochemistry	2+0	4,0
BiY 388	Molecular Biology Techniques	2+0	4,0	BiY 472	(Eng.) Nutritional Biochemistry	2+0	4,0
BiY 390	Wastewater Microbiology	2+0	4,0	BiY 473	Biophotography	2+0	4,0
BiY 391	Cell Signaling Mechanisms	2+0	4,0	BiY 474	Medical Parasitology	0+3	5,0
BiY 392	Human Gene Therapeutics and Recombinant Production	2+0	4,0	BiY 475	Mycotoxins	2+0	4,0
BiY 393	Techniques and Practicing of Grant Proposal Writing	2+0	4,0	BiY 476	Food Microbiology	2+0	4,0
BiY 394	Entrepreneurship in Biology:Design and Development	2+0	4,0	BiY 477	Microfungus Identification Methods	0+3	5,0
BiY 399	Economic Zoology	2+0	4,0	BiY 478	Plant Identification and Herbarium Techniques	0+3	5,0
BiY 401	Plant Mineral Nutrition	2+0	4,0	BiY 479	Astrobotany	2+0	4,0
BiY 408	Embryology	2+0	4,0	BiY 480	Industrial Microbiology	2+0	4,0
BiY 409	Human Genetics	2+0	4,0	BiY 482	Introductory Molecular Biotechnology	2+0	4,0
BiY 410	Medical Microbiology	2+0	4,0	BiY 484	Molecular Microbiology Techniques	0+3	5,0
BiY 413	Soil-Plant Relation	2+0	4,0	iNG 361	(Eng.) English for Specific Purposes I	2+0	4,0
BiY 415	Fish Biology	2+0	4,0	iNG 362	(Eng.) English for Specific Purposes II	2+0	4,0
BiY 416	Aquaculture	2+0	4,0				

Elective Courses

BEÖ 155	Physical Education	2+0	2,0	ESTÜ 133	Disability and Awareness	3+0	3,0
BİL 150	Fundamentals of Information Technology	4+0	5,0	ESTÜ 307	Children Rights and Family Education	2+0	2,0
ESTÜ 101	Introduction to University Life	0+1	2,0	ESTÜ 401	Introduction to Professional Life	1+1	2,0
ESTÜ 104	Academic and Life Skills	2+1	3,0	ESTÜ 402	Coaching and Leadership	3+0	3,0
ESTÜ 106	Project Management	2+1	3,0	İLT 201	Interpersonal Communication	3+0	4,5
ESTÜ 111	Volunteering Works	1+2	4,0	İNG 325	Academic English III	3+0	3,0
ESTÜ 112	Cyber Security for Everyone	2+0	2,0	İNG 326 (Eng.)	Academic English IV	3+0	3,0
ESTÜ 113	Design Thinking	3+0	3,0	İSN 409	Organizational Communication	3+0	4,5
ESTÜ 114	Visual Thinking	3+0	3,0	KÜL 199	Cultural Activities	0+2	2,0
ESTÜ 115	Photographic Viewpoint	2+1	3,0	MÜZ 155	Turkish Folk Music	2+0	2,0
ESTÜ 116	Computer Aided Design I	3+0	3,0	MÜZ 157	Traditional Turkish Art Music	2+0	2,0
ESTÜ 117	Computer Aided Design II	3+0	3,0	RTV 281	Digital Literacy	2+2	4,0
ESTÜ 118	Visual Thinking with Concepts	3+0	3,0	SAN 155	Hall Dances	0+2	2,0
ESTÜ 119	Flute	3+1	3,0	SNT 155	History of Art	2+0	2,0
ESTÜ 120	Solfege	3+1	3,0	SOS 155	Folkdance	2+0	2,0
ESTÜ 121	Piano	3+1	3,0	THU 203	Community Services	0+2	3,0
ESTÜ 122	Guitar	3+1	3,0	TÜR 120	Turkish Sign Language	3+0	3,0
ESTÜ 132	History of Political Thought	3+0	3,0				

Foreign Language Courses

ALM 175	(Ger.) German I	3+0	3,0	FRA 176	(Fra.) French II	3+0	3,0
ALM 176	(Ger.) German II	3+0	3,0	İNG 187	(Eng.) English I	3+0	3,0
FRA 175	(Fra.) French I	3+0	3,0	İNG 188	(Eng.) English II	3+0	3,0

CHEMICAL BIOLOGICAL RADIOLOGICAL AND NUCLEAR (CBRN) DEFENSEMINOR PROGRAM

Within the scope of global policies, it is aimed to gain knowledge about preventing, recognizing, defending and reducing the impact of CBRN risks, which are increasing in trend. In the event of any possible attack, epidemic or accident, educating undergraduate students and graduates who have a Deceptive and interdisciplinary approach to the subject will be important not only from the point of view of public health, but also from the point of view of national security. This program provides added value by educating students who master the precautions, defense and mitigation procedures to be taken in case of CBRN attacks, accidents and risks that are likely to create a national security vulnerability. The information required to be obtained within the scope of this program includes the recognition, control, reduction of effects, defense of CBRN warfare agents. The skills acquired within the scope of this information include an approach that can create a detection system not only theoretically but also practically, and also triggers a perspective that can create innovative technologies for defense and decontamination. It will be encouraged that the knowledge, skills and approaches obtained from the program will be presented as an intellectual property product or a scientific article.

PROGRAM

I.Semester				II.Semester			
KBRN301	Biological Security and Defense	2+0	3.0	KBRN302	CBRN National and International Legislation in Defense	2+0	3.0
KBRN305	Nuclear Radiation and	3+0	4.0	KBRN303	CBRN Defense Approaches and Components	2+0	3.0
	Elective Courses		9,0	KBRN304	Detection, Diagnosis and Interdisciplinary Laboratory Studies of CBRN War Agents	2+1	5,0
				KBRN306	Approach and Crime Scene Management in CBRN Cases	2+0	3.0
					Elective Courses		6,0
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			16,0				20,0
Elective Courses							
KBRN307	Chemical Threats					2+0	3,0
KBRN308	Ecological Risk Analysis					2+0	3,0
KBRN309	Biological Threats					2+0	3,0
KBRN310	Cellular and Genetic Toxicity from CBRN Threats					2+0	3,0
KBRN312	Food Safety and Sanitation					2+0	3,0
KİM217	Basics About Safe Working Techniques in Chemistry Laboratories					2+0	3,0

DEPARTMENT OF PHYSICS

The Department of Physics aims to teach basic knowledge of physics to our students by using modern technologies with all the teaching staff. The duration of the undergraduate program is 4 years. In order for a student to graduate, he/she must take the Graduation Project I and II courses in his/her senior year, be successful in all courses and have an average of above 2.0. The language of education is Turkish. Graduates of this department can become researchers in their fields, as well as serve in research and development laboratories of various institutions and organizations, modern analysis and quality control laboratories, educational institutions if they acquire the necessary educational formation. There is a master's and doctoral program in our department. Our graduate students enroll in one of the fields of Atomic and Molecular physics, General physics, Solid State Physics and High Energy-Plasma Physics. Research laboratories, Eskişehir. It is equipped with devices at a level that can conduct scientific research with projects received from Technical University and TÜBİTAK.

Department Head : Prof. Dr. Abidin KILIÇ
 Deputy Department Head : Dr. Lecturer. Özge BAĞLAYAN
 Deputy Department Head : Assoc. Prof. Dr Neslihan ŞAHİN

PROGRAM

I.Semester

EMAT 113	Calculus I	4+2	7,5
FİZ 115	Physics I	4+2	7,0
FİZ 117	Physics Laboratory I	1+2	3,0
KİM 121	General Chemistry Laboratory I	0+3	2,0
KİM 133	General Chemistry I	5+0	6,0
TAR 165	Atatürk's Principles and History of Turkish Revolution I	2+0	2,0
	Elective Courses		2,5
			30,0

II.Semester

EMAT 114	Calculus II	4+2	7,5
FİZ 116	Physics II	4+2	7,0
FİZ 118	Physics Laboratory II	1+2	3,0
KİM 122	General Chemistry Laboratory II	0+3	2,0
KİM 134	General Chemistry II	5+0	6,0
TAR166	Atatürk's Principles and History of Turkish Revolution II	2+0	2,0
	Elective Courses		2,5
			30,0

III. Semester

EMAT 211	Differential Equation	3+1	4,5
FİZ 229	Mathematical Methods in Physics I	4+0	5,0
FİZ 231	Waves and Optics	4+0	5,0
FİZ 233	Waves and Optics Laboratory	0+2	2,0
TÜR 125	Turkish Language I	2+0	2,0
	Foreign Language Courses		3,0
	Elective Courses		8,5
			30,0

IV.Semester

FİZ 212	Statistical Physics	4+0	5,0
FİZ 218	Modern Physics	4+0	5,0
FİZ 230	Mathematical Methods in Physics II	4+0	5,0
TER 206	Thermodynamics	4+0	5,0
TER 210	Thermodynamics Laboratory	0+2	2,0
TÜR 126	Turkish Language II	2+0	2,0
	Foreign Language Courses		3,0
	Elective Courses		3,0
			30,0

V.Semester

FİZ 327	Quantum Physics I	4+0	5,0
FİZ 349	Classic Mechanics	5+1	6,0
FİZ 353	Electronics I	1+2	3,0
FİZ 355	Computer Programming for Physicists I	1+1	2,0
FİZ 359	Physics for Natural Sciences	2+0	2,0
FİZSJ 401	Internship	0+2	5,0
	Elective Courses		7,0

VI.Semester

FİZ 328	Quantum Physics II	4+0	5,0
FİZ 346	Quantum Physics Laboratory	0+2	2,0
FİZ 348	Electromagnetic Theory	5+1	6,0
FİZ 354	Electronics II	1+2	3,0
FİZ 356	Computer Programming for Physicists II	1+1	2,0
	Elective Courses		12,0

30,0

30,0

VII.Semester**VIII.Semester**

FİZ 429	Solid State Physics	4+0	5,0	FİZ 428	Nuclear Physics	4+0	5,0
FİZ 433	Atom and Molecular Physics	4+0	5,0	FİZ 460	Graduation Project II	2+4	5,0
FİZ 453	Career Development	2+0	2,0	FİZ 462	Characterization Methods	1+2	3,5
FİZ 459	Graduation Project I	2+4	5,0	iSG 402	Occupational Health and Safety II	2+0	2,0
iSG 401	Occupational Health and Safety I	2+0	2,0		Elective Courses		14,5
	Elective Courses		11,0				
			30,0				30,0

Elective Courses

BEÖ 155	Physical Education	2+0	2,0	FİZ 339	Radioecology and Ecosystem	2+0	3,0
ELO 302	Application of Electronic Circuit Elements	2+0	3,0	FİZ 340	Some Applications of Physics in Medical Science	2+0	3,0
ESTÜ 101	Introduction to University Life	0+1	2,0	FİZ 341	Metrology I	2+0	3,0
ESTÜ 104	Academic and Life Skills	2+1	3,0	FİZ 342	Metrology II	2+0	3,0
ESTÜ 106	Project Management	2+1	3,0	FİZ 343	(Eng.) Machine Learning for Physicists	2+0	3,0
ESTÜ 111	Volunteering Works	1+2	4,0	FİZ 344	Geophysics and Earthquake	2+0	3,0
ESTÜ 112	Cyber Security for Everyone	2+0	3,0	FİZ 351	Structure and Properties of Matter	2+0	3,0
ESTÜ 113	Design Thinking	3+0	2,0	FİZ 361	Project Writing and Academic Presentation Techniques	2+1	3,0
ESTÜ 114	Visual Thinking	3+0	3,0	FİZ 363	Healty Nutrition	2+0	3,0
ESTÜ 115	Photographic Viewpoint	2+1	3,0	FİZ 365	Energy Resources Technology	2+0	3,0
ESTÜ 116	Computer Aided Design I	3+0	3,0	FİZ 403	Spectroscopic Methods	2+0	3,0
ESTÜ 117	Computer Aided Design II	3+0	3,0	FİZ 413	Physical Foundation of Astronomy	2+0	3,0
ESTÜ 118	Visual Thinking with Concepts	3+0	3,0	FİZ 414	Fundamentals of Astrophysics	2+0	3,0
ESTÜ 119	Flute	3+1	3,0	FİZ 416	Environmental Physics	2+0	3,0
ESTÜ 120	Solfege	3+1	3,0	FİZ 425	High Energy Physics	2+0	3,0
ESTÜ 121	Piano	3+1	3,0	FİZ 439	Observational Data Analysis in Astrophysics	2+0	3,0
ESTÜ 122	Guitar	3+1	3,0	FİZ 440	Structural Analysis of Solids	2+0	3,0
ESTÜ 125	Philosophy of Science	3+0	3,0	FİZ 443	Characterization Methods	2+0	3,0
ESTÜ 127	Diction	1+2	3,0	FİZ 444	Satellite Data Analysis Techniques	2+0	3,0
ESTÜ 132	History of Political Thought	3+0	3,0	FİZ 445	Statistical Mechanics	2+0	3,0
ESTÜ 133	Disability and Awareness	3+0	3,0	FİZ 446	Applied Heat Theory	0+2	3,0
ESTÜ 201	Turkish Sign Language	3+0	3,0	FİZ 447	Battery Technologies I	2+0	3,0
ESTÜ 203	Introduction to Sociology	3+0	3,0	FİZ 449	Structural and Vibrational Theory of Molecules	2+0	3,0
ESTÜ 204	Effective Reading and Writing Skills	3+0	4,0	FİZ 451	Numerical Methods in Physics	2+0	3,0
iNG 225	Academic English I	3+0	3,0	FİZ 457	Physics Games	2+0	3,0
ESTÜ 301	Science Communication	2+0	3,0	FİZ 458	MATLAB for Physicists	2+0	3,0

ESTÜ 307	Children Rights and Family Education	2+0	2,0	FİZ 461		Introduction to Turbulence	3+0	3,0
İNG 226	Academic English II	3+0	3,0	FİZ 464		Web Designing	1+1	3,0
ESTÜ 401	Introduction to Professional Life	1+1	2,0	FİZ 466		Magnetic Materials	2+0	3,0
İNG 425	Academic English V	3+0	3,0	FİZ 468		Particle Physics	2+0	3,0
FİZ 113	Technical English	4+0	4,0	FİZ 470		Battery Technologies II	2+0	3,0
FİZ 122	English for Physicists	4+0	4,0	İLT 201		Interpersonal Communication	3+0	4,5
FİZ 304	Clean Energy Sources	2+0	3,0	İNG 325		Academic English III	3+0	3,0
FİZ 318	Introduction to Heat Transfer	2+0	3,0	İNG 326	(Eng.)	Academic English IV	3+0	3,0
FİZ 321	Semiconductors	2+0	3,0	İŞL 301		Human Resources Management	3+0	4,0
FİZ 322	Semiconductors Devices	2+0	3,0	MEK 308		Fluid Mechanics	2+0	3,0
FİZ 329	Semiconductors Laboratory	2+0	3,0	MÜZ 151		Short History of Music	2+0	3,0
FİZ 330	Semiconductor Applied Laboratory	2+0	3,0	MÜZ 157		Traditional Turkish Art Music	2+0	2,0
FİZ 331	Nobel Prizes on Physics	2+0	3,0	PZL 302		Marketing Management	3+0	4,5
FİZ 332	Introduction to Low Temperature Physics	2+0	3,0	RTV 281		Digital Literacy	2+2	4,0
FİZ 333	Quality Control Methods in Physics	2+0	3,0	SAN 155		Hall Dances	0+2	2,0
FİZ 336	Solar Photovoltaics	2+0	3,0	SNT 155		History of Art	2+0	2,0
FİZ 337	Solar Energy and Applications	2+0	3,0	SOS 155		Folkdance	2+0	2,0
İNG 426	Academic English VI	3+0	3,0	ESTÜ 208		Scientific Research Methods	2+1	3,0
ESTÜ 205	Addiction and Addiction Intervention	2+0	3,0	ESTÜ 402		Coaching and Leadership	3+0	3,0

Foreign Language Courses

ALM 175	(Ger.)	German I	3+0	3,0	FRA 176	(Fra.)	French II	3+0	3,0
ALM 176	(Ger.)	German II	3+0	3,0	İNG 187	(Eng.)	English I	3+0	3,0
FRA 175	(Fra.)	French I	3+0	3,0	İNG 188	(Eng.)	English II	3+0	3,0

NANOSCIENCE MINOR PROGRAM

The main purpose of the program is for our students who have enrolled in the program to have knowledge about the structure of matter in the Nanoscale order, to study the applications of this knowledge in different disciplines, to convert information into practice in the Nanoscale Research Laboratory of the Physics Department. This program will contribute to research studies conducted at the nanoscale order to contribute towards meeting the need for manpower. The information that needs to be obtained within the scope of this program is to know the structure of nanoscale material, to make nanoscale characterization of the material, to evaluate the availability of organic and inorganic materials for technological products.

PROGRAM

I.Semester				II.Semester			
NANO301	Characterization Techniques for Nanoscience and Nanotechnology	3+0	5,0	NANO302	Nanotoxicology	3+0	5,0
NANO303	Basics of Nanoscience and Nanotechnology	3+0	5,0	NANO304	Hybrid Nanomaterials and Applications	3+0	5,0

Elective Courses	--	9,0	Elective Courses	--	6,0
		----			----
		19,0			16,0

Elective Courses

FiZ327	Quantum Physica I	4+0	5,0
FiZ328	Quantum Physics II	4+0	5,0
FiZ346	Quantum Physics Laboratory	0+2	2,0
KiM336	Surface and Thermal Analysis Methods	1+2	3,0
NANO305	Synthesis and Characterization of Nanomaterials	2+0	3,0
NANO306	Electrochemistry Applications of Nanomaterials	2+0	3,0
NANO307	Fundamentals of Micro and Nanofabrication	2+0	3,0
NANO308	Molecular Biotechnology	2+0	3,0
NANO309	Low-Dimensional Semiconductors	2+0	3,0
NANO310	Nanoparticles: Antimicrobial Activities, Applications And Toxicity	2+0	3,0
NANO311	Color and Color Science	2+0	3,0
NANO312	Introduction to Bionanotechnology	2+0	3,0

DEPARTMENT OF STATISTICS (30% ENGLISH)

The Department of Statistics consists of the Departments of Statistical Information Systems, Statistical Theory, Applied Statistics and Probability Theory and Processes. In addition to the theoretical courses offered in the department, there are application-oriented computer laboratories with the necessary database to provide specialization in the field. The aim of the department is to train qualified researchers who can determine the data sources and flow channels related to comprehensive experiments and observations in a system using the technologies of the day, centralize the data and produce the necessary information by commenting on the behavior of the relevant system as a result of the necessary solutions. Graduates of the Department of Statistics, as well as academic staff of universities, in the banking and insurance sector, research companies, quality control and inventory evaluation units of the public and private sectors, newspapers and television institutions and hospitals, etc. they can be employed in places.

Department Head	: Prof. Dr. Berna YAZICI
Deputy Department Head	: Asst. Prof. Dr. İsmail YENİLMEZ
Deputy Department Head	: Asst. Prof. Dr. Mustafa ÇAVUŞ

PROGRAM

I.Semester

EMAT 111	Calculus I	4+2	7,5
EMAT 111 (Eng.)	Calculus I	4+2	7,5

II.Semester

BiL 168	Computer Programming	4+0	5,0
EMAT 112	Calculus II	4+2	7,5

İST 109		Document Preparation in Computer	3+0	3,5	EMAT 112	(Eng.)	Calculus II	4+2	7,5
İST 109	(Eng.)	Document Preparation in Computer	3+0	3,5	İST 126		Probability II	4+0	6,0
İST 129		Statistics I	4+0	6,0	İST 126	(Eng.)	Probability II	4+0	6,0
İST 129	(Eng.)	Statistics I	4+0	6,0	İST 130		Statistics II	4+0	6,0
İST 239		Probability I	4+0	6,0	İST 130	(Eng.)	Statistics II	4+0	6,0
İST 239	(Eng.)	Probability I	4+0	6,0	TAR 166		Atatürk's Principles and History of Turkish Revolution II	2+0	2,0
TAR 165		Atatürk's Principles and History of Turkish Revolution I	2+0	2,0			Elective Courses		3,5
		Elective Courses		5,0					
				30,0					30,0

III.Semester

IV.Semester

İST 235		Linear Algebra I	4+0	5,0	BİL 802		Visual Programming	4+0	4,0
İST 247		Mathematical Statistics I	4+0	7,0	İST 236		Linear Algebra II	4+0	5,0
İST 247	(Eng.)	Mathematical Statistics I	4+0	7,0	İST 248		Mathematical Statistics II	4+0	7,0
MAT 209		Analysis I	4+0	7,0	İST 248	(Eng.)	Mathematical Statistics II	4+0	7,0
TÜR 125		Turkish Language I	2+0	2,0	MAT 212		Analysis II	4+0	7,0
		Area Elective Courses		5,0	TÜR 126		Turkish Language II	2+0	2,0
		Elective Courses		4,0			Area Elective Courses		3,0
							Elective Courses		2,0
				30,0					30,0

V.Semester

VI.Semester

İST 305		Operational Research	3+0	6,0	İKT 382		Econometrics I	4+0	6,0
İST 309		Experimental Design I	3+0	6,0	İKT 382	(Eng.)	Econometrics I	4+0	6,0
İST 309	(Eng.)	Experimental Design I	3+0	6,0	İST 311		Non-Parametric Statistical Methods	3+0	5,5
İST 333		Regression Analysis	4+0	6,5	İST 311	(Eng.)	Non-Parametric Statistical Methods	3+0	5,5
İST 333	(Eng.)	Regression Analysis	4+0	6,5	İST 335		Sampling	4+0	6,5
İST 351		Statistical Packages I	2+0	3,0	İST 352		Statistical Packages II	2+0	3,0
		Area Elective Courses		5,0			Area Elective Courses		6,0
		Elective Courses		3,5			Elective Courses		3,0
				30,0					30,0

VII.Semester

VIII.Semester

İST 411		Time Series Analysis	4+0	5,0	İST 430		Stochastic Processes	4+0	5,0
İST 439		Graduation Project I	0+4	4,5	İST 440		Graduation Project II	0+4	4,5
İST 439	(Eng.)	Graduation Project I	0+4	4,5	İST 440	(Eng.)	Graduation Project II	0+4	4,5

İST 451		Multivariate Statistics I	4+0	6,0			Area Elective Courses	17,0
İST 451	(Eng.)	Multivariate Statistics I	4+0	6,0			Elective Courses	3,5
İSTSJ 402		Internship	0+2	5,0				
		Area Elective Courses		5,0				
		Elective Courses		4,5				
				<u>30,0</u>				<u>30,0</u>

Area Elective Courses

ARY 202		Research Techniques	3+0	5,0	İST 356	(Eng.)	Programming with Python	4+0	5,0
BİL 801		Object Oriented Programming	4+0	4,0	İST 356		Programming with Python	4+0	5,0
İKT 460		Financial Econometrics	3+0	4,5	İST 358	(Eng.)	Database and Management	3+0	4,5
İKT 460	(Eng.)	Financial Econometrics	3+0	4,5	İST 412		Fuzzy Logic	2+0	3,0
İKT 482		Econometrics II	4+0	6,0	İST 413		Introduction to Artificial Neural Networks	3+0	5,0
İST 228		Advanced Operation Research	3+0	4,5	İST 415		Reliability Analysis	3+0	5,0
İST 243		Exploratory Data Analysis	2+0	3,0	İST 420		Demography	2+0	3,0
İST 243	(Eng.)	Exploratory Data Analysis	2+0	3,0	İST 432	(Eng.)	Simulation	4+0	4,5
İST 249		Programing with Matlab	4+0	5,0	İST 432		Simulation	4+0	4,5
İST 249	(Eng.)	Programing with Matlab	4+0	5,0	İST 438		Machine Learning Methods and Applications	3+0	4,5
İST 256	(Eng.)	Introduction to R Programming	3+0	4,5	İST 438	(Eng.)	Machine Learning Methods and Applications	3+0	4,5
İST 257	(Eng.)	Introduction to Data Science	2+0	3,0	İST 452		Multivariate Statistics II	4+0	6,0
İST 331		Theoretical Hypothesis Testing	3+0	4,5	İST 452	(Eng.)	Multivariate Statistics II	4+0	6,0
İST 331	(Eng.)	Theoretical Hypothesis Testing	3+0	4,5	NÜM 308		Numerical Analysis I	2+2	5,0
İST 332		Decision Making Theory	2+0	3,0	TKY 302		Quality Control	3+0	4,5
İST 332	(Eng.)	Decision Theory	2+0	3,0	TKY 302	(Eng.)	Quality Control	3+0	4,5
İST 334		Experimental Design II	4+0	6,0	YBİM 302		Recommender Systems	3+0	4,5
İST 334	(Eng.)	Experimental Design II	4+0	6,0	YBİM 304		Mobile Programming	3+0	5,0
İST 337		Multivariate Time Series	3+0	4,0	YİST 301		Applied Econometrics	3+0	5,0
İST 347		Spreadsheets and Databases	3+0	3,5	YİST 301	(Eng.)	Data Visualization	3+0	5,0
İST 347	(Eng.)	Spreadsheets and Databases	3+0	3,5	YİST 303		CRM and Customer Analytics	3+0	5,0
İST 349	(Eng.)	Statistical Modelling Techniques	3+0	5,0	YPZL 301		Social Media and Digital Marketing	2+0	4,0
İST 353		Case Studies in Data Science	3+0	5,0	YPZL 302		Multivariate Statistics II	3+0	5,0

Elective Courses

ESTÜ 112		Cyber Security for Everyone	2+0	2,0	İLT 408		Etkili ve Güzel Konuşma Teknikleri	2+0	2,5
ESTÜ 113		Design Thinking	3+0	3,0	İNG 325	(Eng.)	Akademik İngilizce III	3+0	3,0

ESTÜ 114	Visual Thinking	3+0	3,0	İNG 326	(Eng.)	Academic English IV	3+0	3,0
ESTÜ 115	Photographic Viewpoint	2+1	3,0	İNG 425		Academic English V	3+0	3,0
ESTÜ 116	Computer Aided Design I	3+0	3,0	İNG 426	(Eng.)	Academic English VI	3+0	3,0
ESTÜ 117	Computer Aided Design II	3+0	3,0	İSN 409		Organizational Communication	3+0	4,5
ESTÜ 118	Visual Thinking with Concepts	3+0	3,0	İŞL 101		Introduction to Business	3+0	4,5
ESTÜ 119	Flute	3+1	3,0	İŞL 101		Introduction to Business	3+0	4,5
ESTÜ 120	Solfege	3+1	3,0	İŞL 301		Human Resources Management	3+0	4,0
ESTÜ 121	Piano	3+1	3,0	İŞL 421		Entrepreneurship	2+0	3,0
ESTÜ 122	Guitar	3+1	3,0	İŞL 459		Project Management	2+0	5,0
ESTÜ 123	Gender Equality in Work Life	2+0	3,0	MUH 302		Analysis of Financial Reports	3+0	4,5
ESTÜ 125	Philosophy of Science	3+0	3,0	MÜZ 155		Turkish Folk Music	2+0	2,0
ESTÜ 127	Diction	1+2	3,0	MÜZ 157		Traditional Turkish Art Music	2+0	2,0
ESTÜ 132	History of Political Thought	3+0	3,0	PZL 211		Principles of Marketing	3+0	5,0
ESTÜ 133	Disability and Awareness	3+0	3,0	PZL 302		Marketing Management	3+0	4,5
ESTÜ 201	Turkish Sign Language	3+0	3,0	PZL 453		Marketing Research	3+0	4,5
ESTÜ 203	Introduction to Sociology	3+0	3,0	SAN 155		Hall Dances	0+2	2,0
ESTÜ 204	Effective Reading and Writing Skills	3+0	4,0	SNT 155		History of Art	2+0	2,0
ESTÜ 206	Financial Literacy	3+0	3,0	SOS 155		Folkdance	2+0	2,0
ESTÜ 301	Science Communication	2+0	3,0	THU 203		Community Services	0+2	3,0
ESTÜ 307	Children Rights and Family Education	2+0	2,0	TÜR 120		Turkish Sign Language	3+0	3,0

BUSINESS ANALYTICS MINOR PROGRAM

The aim of the program is to educate students equipped with the necessary general knowledge, techniques and skills that allowmaking the most appropriate strategies and decisions using big data that is emerging in a rapidly digitizing and digitalizing world. It is the mission of the program to contribute to data-oriented decision-making in professional life and thus to meet the need for manpower that will contribute to the maximization of benefits for the company. Students within the scope of this program; Ability to use theoretical and applied knowledge in their fields with sufficient knowledge of issues related to the scope of Business Analytics, Use descriptive, predictive and decision analytics, Work effectively individually and/or together with a team, Design according to their fields, collect data, analyze results, visualize, interpret and report, Process and analyze effectively using information technologies such as SQL, databases and Excel, Perform production planning and operational management, Master big data and artificial intelligence terminology and practice in these areas, Acquires the skills/competencies of combining marketing information with management function and applying it.

PROGRAM

V.Yarıyıl				VI.Yarıyıl			
YİŞA301	Introduction to Business Analytics	4+0	6,0	YİŞA302	Business Analytics and Operations Management	4+0	6,5

YİŞA303	The Basics of Marketing	3+0	4,5	YİŞA304	Big Data and Artificial Intelligence	3+0	5,5
	Elective Courses	--	11,0		Foreign Language Courses	--	9,0
			-----				-----
			21,5				21,0

Elective Courses

BİL409	Decision Support Systems					3+0	6,0
BİM213 (Eng)	Data Structures and Algorithms					2+2	5,5
BİM309 (Eng)	Artificial Intelligence					3+0	4,5
BİM311 (Eng)	Systems Analysis and Design					3+0	4,5
ENM407 (Eng)	Systems Analysis					3+0	5,0
ENM421	Introduction to Data Science					2+1	4,5
ENM440 (Eng)	Introduction to Data Mining					3+0	4,5
ENM444	Supply Chain Modeling and Analysis					3+0	4,5
ENM448 (Eng)	Project Planning and Management					3+0	6,0
İKT460 (Eng)	Financial Econometrics					3+0	4,5
İST256 (Eng)	Introduction to R Programming					3+0	4,5
İST332(Eng)	Decision Making Theory					2+0	3,0
İST356	Programming with Python					4+0	5,0
İST358 (Eng)	Database and Management					3+0	4,5
İST411	Time Series Analysis					4+0	5,0
İST438 (Eng)	Machine Learning Methods and Applications					3+0	4,5
İŞL417	Management Information System					3+0	4,5
LOJ401 (Eng)	Logistics Management and Models					3+0	6,0
PZL302	Marketing Management					3+0	4,5
PZL452 (Eng)	Revenue Management and Pricing					3+0	6,0
REK448	Brand Management					3+0	4,0
YBİM302	Recommendation Systems					3+0	4,5
YBİM304	Mobile Programming					3+0	5,0
YİST301 (Eng)	Applied Econometrics					3+0	5,0
YİST303	Data Visualization					3+0	5,0
YPZL301	CRM and Customer Analytics					2+0	4,0
YPZL302	Social Media and Digital Marketing					3+0	5,0

DEPARTMENT OF CHEMISTRY (30% ENGLISH)

Chemistry is a basic science that has a strong interaction with many branches of science such as physics, biology, engineering and pharmacy. These branches of science are heavily intertwined with chemistry or are supported by chemistry. In addition, knowledge of chemistry is necessary in the development and application of technology in many fields. The Department of Chemistry consists of Analytical Chemistry, Inorganic Chemistry, Biochemistry, Organic Chemistry and Physical Chemistry departments. The courses given have been created at an advanced level in order to cover basic chemistry knowledge and taking into account the five mentioned departments. In addition to the facilities provided by Eskişehir Technical University, the research laboratories are equipped with devices at a level that can conduct scientific research with projects received from TUBITAK. The aim of the chemistry department is to train personnel who can solve the problems required by the industry in research laboratories, who can conduct independent research, who are equipped with sufficient knowledge and skills to perform all kinds of chemical analysis, and to equip these personnel with the latest knowledge of science and technology. Graduates of this department can become researchers in their fields, as well as provide useful and productive services in research / development laboratories of various institutions and organizations, modern analysis and quality control laboratories, educational institutions if they acquire the necessary educational formation.

Department Head : Prof. Dr. İlhami ÇELİK
 Deputy Department Head : Assoc. Prof. Dr. Elif Mine ÖNCÜ KAYA
 Deputy Department Head : Asst. Prof. Dr. Sultan Funda EKTİ

PROGRAM

I.Semester				II.Semester			
BİY 127	Biology for Chemists I	2+0	2,0	BİY 128	Biology for Chemists II	2+0	2,0
EMAT 113	Calculus I	4+2	7,5	EMAT 114	Calculus II	4+2	7,5
EMAT 113 (Eng.)	Calculus I	4+2	7,5	EMAT 114 (Eng.)	Calculus II	4+2	7,5
FİZ 107	Physics Laboratory I	0+2	1,5	FİZ 108	Physics Laboratory II	0+2	1,5
FİZ 107 (Eng.)	Physics Laboratory I	0+2	1,5	FİZ 108 (Eng.)	Physics Laboratory II	0+2	1,5
FİZ 129	Physics I	4+0	6,0	FİZ 130	Physics II	4+0	6,0
FİZ 129 (Eng.)	Physics I	4+0	6,0	FİZ 130 (Eng.)	Physics II	4+0	6,0
KİM 121	General Chemistry Laboratory I	0+3	2,0	KİM 122	General Chemistry Laboratory II	0+3	2,0
KİM 121 (Eng.)	General Chemistry Laboratory I	0+3	2,0	KİM 122 (Eng.)	General Chemistry Laboratory II	0+3	2,0
KİM 133	General Chemistry I	5+0	6,0	KİM 134	General Chemistry II	5+0	6,0
KİM 133 (Eng.)	General Chemistry I	5+0	6,0	KİM 134 (Eng.)	General Chemistry II	5+0	6,0
TÜR 125	Turkish Language I	2+0	2,0	TÜR 126	Turkish Language II	2+0	2,0
	Elective Courses		3,0		Elective Courses		3,0
30,0				30			

III.Semester					IV.Semester				
iSG 401		Occupational Health and Safety I	2+0	2,0	iSG 402		Occupational Health and Safety II	2+0	2,0
KiM 221		Analytical Chemistry Laboratory I	0+6	3,0	KiM 222		Analytical Chemistry Laboratory II	0+6	3,0
KiM 221	(Eng.)	Analytical Chemistry Laboratory I	0+6	3,0	KiM 222	(Eng.)	Analytical Chemistry Laboratory II	0+6	3,0
KiM 257		Inorganic Chemistry I	4+0	5,0	KiM 240		Instrumental Analysis I	3+0	4,0
KiM 257	(Eng.)	Inorganic Chemistry I	4+0	5,0	KiM 276		Analytical Chemistry II	4+0	5,0
KiM 275		Analytical Chemistry I	4+0	5,0	KiM 276	(Eng.)	Analytical Chemistry II	4+0	5,0
KiM 275	(Eng.)	Analytical Chemistry I	4+0	5,0	KiM 278		Organic Chemistry II	4+0	5,0
KiM 277		Organic Chemistry I	4+0	4,0	KiM 278	(Eng.)	Organic Chemistry II	4+0	5,0
KiM 277	(Eng.)	Organic Chemistry I	4+0	4,0	KiM 334		Inorganic Chemistry II	4+0	5,0
TAR 165		Atatürk's Principles and History of Turkish Revolution I	2+0	2,0	KiM 334	(Eng.)	Inorganic Chemistry II	4+0	5,0
		Elective Courses		9,0	TAR 166		Atatürk's Principles and History of Turkish Revolution II	2+0	2,0
							Elective Courses		4,0
									30

V.Semester					VI.Semester				
KiM 321		Organic Chemistry Laboratory I	0+4	4,0	KiM 322		Organic Chemistry Laboratory II	0+4	4,0
KiM 321	(Eng.)	Organic Chemistry Laboratory I	0+4	4,0	KiM 322	(Eng.)	Organic Chemistry Laboratory II	0+4	4,0
KiM 325		Inorganic Chemistry Laboratory I	0+3	4,0	KiM 324		Physical Chemistry Laboratory I	0+3	4,0
KiM 325	(Eng.)	Inorganic Chemistry Laboratory I	0+3	4,0	KiM 326		Inorganic Chemistry Laboratory II	0+3	4,0
KiM 337		Organic Chemistry III	4+0	6,0	KiM 326	(Eng.)	Inorganic Chemistry Laboratory II	0+3	4,0
KiM 337	(Eng.)	Organic Chemistry III	4+0	6,0	KiM 346		Physical Chemistry II	3+0	5,0
KiM 343		Instrumental Analysis II	3+0	4,0	KiM 358		Instrumental Analysis III	4+0	4,0
KiM 345		Physical Chemistry I	3+0	5,0	KiM 358	(Eng.)	Instrumental Analysis III	4+0	4,0
KiM 359		Literature Searching	1+0	1,0			Elective Courses		9,0
		(Internship) Area Elective Courses	0+2	5,0					
		Elective Courses		1,0					
									30

VII.Semester					VIII.Semester				
KiM 401		Biochemistry I	3+0	3,0	KiM 402		Biochemistry II	3+0	3,0
KiM 401	(Eng.)	Biochemistry I	3+0	3,0	KiM 402	(Eng.)	Biochemistry II	3+0	3,0
KiM 409		Chemistry in Industry	3+0	4,0	KiM 408		Atom and Molecular Chemistry	2+0	2,0

KİM 423		Industrial Chemical Laboratory	0+4	3,0	KİM 412		Biochemistry Laboratory	0+3	3,0
KİM 435		Physical Chemistry III	4+0	4,0	KİM 425		Physical Chemistry Laboratory II	0+3	3,0
KİM 435	(Eng.)	Physical Chemistry III	4+0	4,0	KİM 425	(Eng.)	Physical Chemistry Laboratory II	0+3	3,0
KİM 447		Instrumental Analysis Laboratory I	0+4	3,0	KİM 448		Instrumental Analysis Laboratory II	0+4	3,0
		Area Elective Courses		10,0			Area Elective Courses		13,0
		Elective Courses		3,0			Elective Courses		3,0
				<u>30,0</u>					<u>30,0</u>

Area Elective Courses

KİM 459		Graduation Project I	2+4	10,0	KİM 460		Graduation Project II	2+4	13,0
KİM 459	(Eng.)	Graduation Project I	2+4	10,0	KİM 460	(Eng.)	Graduation Project II	2+4	13,0
					KİMSJ 303		Internship	0+2	5,0

Elective Courses

ALM 175	(Ger.)	German I	3+0	3,0	KİM 341		Green Organic Chemistry	2+0	3,0
ALM 176	(Ger.)	German II	3+0	3,0	KİM 347		Food Chemistry and Technology	2+0	3,0
BEÖ 155		Physical Education	2+0	2,0	KİM 348		Colour Chemistry and Synthesis Methods	2+0	3,0
BİL 425		Computer Assisted Chemical Calculations	2+0	3,0	KİM 349		Structure Characterization of Organic Compounds	2+0	3,0
BİY 461		Biotechnology	2+0	3,0	KİM 350		Introduction to Stereochemistry	2+0	3,0
ESTÜ 101		Introduction to University Life	0+1	2,0	KİM 353		Laboratory Accreditation	2+0	3,0
ESTÜ 104		Academic and Life Skills	2+1	3,0	KİM 354		Food Safety and Management Systems	2+0	3,0
ESTÜ 106		Project Management	2+1	3,0	KİM 355		Hazardous Materials of Chemical and Safety I	2+0	3,0
ESTÜ 111		Volunteering Works	1+2	4,0	KİM 356		Hazardous Materials of Chemical and Safety II	2+0	3,0
ESTÜ 112		Cyber Security for Everyone	2+0	2,0	KİM 357		Introduction to Adsorption	2+0	3,0
ESTÜ 113		Design Thinking	3+0	3,0	KİM 360		Introduction to Polymer Chemistry	2+0	3,0
ESTÜ 114		Visual Thinking	3+0	3,0	KİM 362	(Eng.)	Technical Writing for Chemists	2+0	3,0
ESTÜ 115		Photographic Viewpoint	2+1	3,0	KİM 415		Introduction to Heterocyclic Chemistry	2+0	3,0
ESTÜ 116		Computer Aided Design I	3+0	3,0	KİM 419		Dyestuff Chemistry	2+0	3,0
ESTÜ 117		Computer Aided Design II	3+0	3,0	KİM 427		Analysis Techniques in Gas Chromatography	1+2	3,0

ESTÜ 118		Visual Thinking with Concepts	3+0	3,0	KİM 429		Chemistry of Main Group Elements	2+0	3,0
ESTÜ 119		Flute	3+1	3,0	KİM 430		Biotechnological Methods	2+0	3,0
ESTÜ 120		Solfege	3+1	3,0	KİM 432		Organic Synthesis	2+0	3,0
ESTÜ 121		Piano	3+1	3,0	KİM 433		The Separation Techniques in Inorganic Chemistry	2+0	3,0
ESTÜ 122		Guitar	3+1	3,0	KİM 434		Coordination Chemistry	2+0	3,0
ESTÜ 132		History of Political Thought	3+0	3,0	KİM 434	(Eng.)	Coordination Chemistry	2+0	3,0
ESTÜ 133		Disability and Awareness	3+0	3,0	KİM 437		Bioaffinity Chromatography	2+0	3,0
ESTÜ 307		Children Rights and Family Education	2+0	2,0	KİM 438		Analysis Technics of Liquid Chromatography	1+2	3,0
ESTÜ 401		Introduction to Professional Life	1+1	2,0	KİM 439		Work and Worker Safety for Chemists	2+0	3,0
FRA 175	(Fra.)	French I	3+0	3,0	KİM 440		Polymer Technology	2+0	3,0
FRA 176	(Fra.)	French II	3+0	3,0	KİM 444		Forensic Chemistry	2+0	3,0
İNG 325	(Eng.)	Academic English III	3+0	3,0	KİM 445		Introduction to Archaeological Chemistry	2+0	3,0
İNG 326	(Eng.)	Academic English IV	3+0	3,0	KİM 446		Natural Polymeric Materials	2+0	3,0
İNG 425	(Eng.)	Academic English V	3+0	3,0	KİM 450		Asymmetric Organic Synthesis Introduction	2+0	3,0
İNG 426	(Eng.)	Academic English VI	3+0	3,0	KİM 452		Bioinorganic Chemistry	2+0	3,0
İŞL 475		Techno-Entrepreneurship	3+0	4,0	KİM 453		Chemistry and Technology of Paints	2+0	3,0
KİM 209		Mathematical Methods for Chemistry	2+0	3,0	KİM 454		Chemistry of Colloids	2+0	3,0
KİM 215		Environnant Problems	2+0	3,0	KİM 455		Applied Nuclear Magnetic Resonance Spectroscopy Technics	2+0	3,0
KİM 217		Basics About Safe Working Techniques in Chemistry Laboratories	2+0	3,0	KİM 456		Chemistry of Cosmetics	2+0	3,0
KİM 218		Radiation in Daily Life	2+0	3,0	MÜZ 151		Short History of Music	2+0	3,0
KİM 259		History of Chemistry	2+0	3,0	MÜZ 155		Turkish Folk Music	2+0	2,0
KİM 280		Glass Chemistry and Its Applications	2+1	3,0	MÜZ 157		Traditional Turkish Art Music	2+0	2,0
KİM 305		Water and Wastewater Analyses	2+0	3,0	SAĞ 222		First Aid	2+1	3,0
KİM 314		Textile Chemistry and Its Applications	1+2	3,0	SAN 155		Hall Dances	0+2	2,0
KİM 315		The Chemistry of Ceramics	2+0	3,0	SNT 155		History of Art	2+0	2,0
KİM 316		Drugs	2+0	3,0	SOS 155		Folkdance	2+0	2,0
KİM 318		The Extraordinary Chemistry of Ordinary Things	2+0	3,0	THU 203		Community Services	0+2	3,0
KİM 331		Analysis Methods in Atomic Absorption	1+2	3,0	TKY 404		Quality Management System	2+0	3,0
KİM 336		Surface and Thermal Analysis Methods	1+2	3,0	TKY 409		Industrial Quality Systems	2+0	3,0
KİM 338		X-Ray Diffraction Analysis Techniques	1+2	3,0	TÜR 120		Turkish Sign Language	3+0	3,0
KİM 339		Inorganic Technologies	2+0	3,0					

DEPARTMENT OF MATHEMATICS

In the Mathematics Department, education, training and research are carried out in areas such as analysis, algebra, geometry, topology, applied mathematics and mathematics education, which are the main areas of mathematics. Students of the department have the opportunity to take business, economics, social content courses offered in various departments of the university as elective courses. In this way, they have the opportunity to expand their general culture as well as their field knowledge. In addition, there are opportunities for successful students to do second major and minor. Graduates of the department who have completed a master's degree without thesis at the Graduate School of Education can work as mathematics teachers at public or private secondary education institutions. In addition, graduates can work in various public and private organizations, banks in positions such as computer scientist, researcher, planner. Successful graduates also have the opportunity to become research assistants at universities and to study abroad.

Department Head : Prof. Dr. Hüseyin AZCAN
 Deputy Department Head : Prof. Dr. Fiğen TAKIL MUTLU
 Deputy Department Head : Asst. Prof. Dr. Bahar KARAMAN

PROGRAM

I.Semester				II.Semester			
EMAT 113	Calculus I	4+2	7.5	EMAT 114	Calculus II	4+2	7.5
FİZ 107	Physics Laboratory I	0+2	1,5	MAT 116	Analytic Geometry II	2+2	5.0
FİZ 129	Physics I	4+0	6.0	MAT 118	Abstract Mathematics II	2+2	5.0
MAT 115	Analytic Geometry I	2+2	5.0	MAT 818	Calculus Laboratory II	0+2	2.0
MAT 117	Abstract Mathematics I	2+2	5.0		Foreign Language Courses		3,0
MAT 817	Calculus Laboratory I	0+2	2,0		Elective Courses		7.5
	Foreign Language Courses		3,0				
			30,0				30,0
III.Semester				IV.Semester			
MAT 203	Linear Algebra I	4+0	5.0	MAT 204	Linear Algebra II	4+0	5.0
MAT 213	Computer Programming I	2+2	5.0	MAT 214	Computer Programming II	2+2	5.0
MAT 215	Differential Equations I	2+2	5,0	MAT 216	Differential Equations II	2+2	5.0
MAT 221	Analysis I	4+2	7,0	MAT 222	Analysis II	4+2	7.0

TAR 165	Atatürk's Principles and History of Turkish Revolution I	2+0	2,0	MAT 230	Basic and Scientific Ethics	2+0	2.0
TÜR 125	Turkish Language I	2+0	2,0	TAR 166	Atatürk's Principles and History of Turkish Revolution II	2+0	2.0
	Area Elective Courses		4.0	TÜR 126	Turkish Language II	2+0	2.0
					Area Elective Courses		2.0
			30,0				30,0

V.Semester

MAT 321	Complex Analysis I	2+2	5.0	MAT 322	Complex Analysis II	2+2	5.0
MAT 323	Abstract Algebra I	2+2	5.0	MAT 324	Abstract Algebra II	2+2	5.0
MAT 325	Metric and Topological Spaces I	2+2	5.0	MAT 326	Metric and Topological Spaces II	2+2	5.0
MAT 327	Analysis III	4+2	7.0	MAT 328	Analysis IV	4+2	7.0
	Area Elective Courses		5.0		Area Elective Courses		5.0
	Elective Courses		3.0		Elective Courses		3,0
			30,0				30,0

VI.Semester

VII.Semester

MAT 403	Real Analysis I	3+0	5.0	MAT 402	Real Analysis II	3+0	5.0
MAT 405	Functional Analysis I	3+0	5.0	MAT 404	Functional Analysis II	3+0	5.0
MAT 441	Graduation Project	0+3	6.0		Area Elective Courses		10.0
MAT 441	(İng.) Graduation Project	0+3	6.0		Elective Courses		10.0
	Area Elective Courses		10.0				
	Elective Courses		4.0				
			30,0				30,0

VIII.Yarıyıl

Area Elective Courses

BİL 378	Database Control Systems	2+2	5.0	MAT 408	Vector Analysis	3+0	5,0
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BİL 379		System Analysis and Design	3+0	5.0	MAT 408	(Eng.)	Vector Analysis	3+0	5,0
BİL 429		Object Oriented Programming	2+2	5.0	MAT 409		Partial Differential Equations	3+0	5,0
BİL 430		Internet Programming	2+2	5.0	MAT 409	(Eng.)	Partial Differential Equations	3+0	5,0
ESTÜ 305		Sürdürülebilir Pazarlama	3+0	5,0	MAT 410		Game Theory	3+0	5,0
EİST 221		İstatistik	3+0	4.0	MAT 410	(Eng.)	Game Theory	3+0	5,0
İST 213		Statistics	3+0	3.0	MAT 412		Education of Axiomatic Geometry	3+0	5,0
MAT 218		Probability	3+0	5.0	MAT 413		Fourier Analysis	3+0	5,0
MAT 226		Documentation with LaTeX	3+0	5,0	MAT 413	(Eng.)	Fourier Analysis	3+0	5,0
MAT 227		Introduction to Graph Theory	3+0	5,0	MAT 414		Dynamical Systems	3+0	5,0
MAT 228		Geometry I	3+0	5,0	MAT 414	(Eng.)	Dynamical Systems	3+0	5,0
MAT 239		Geometry II	3+0	5,0	MAT 417		Calculus of Variations	3+0	5,0
MAT 239	(Eng.)	Discrete Mathematics	3+0	5,0	MAT 417	(Eng.)	Calculus of Variations	3+0	5,0
MAT 256		English for Mathematicians	3+0	5,0	MAT 420		Tensor Analysis	3+0	5,0
MAT 256	(Eng.)	English for Mathematicians	3+0	5,0	MAT 422		Continuous Dynamical Systems	3+0	5,0
MAT 263		Proof Without Words	2+0	3,0	MAT 429		Galois Theory	3+0	5,0
MAT 265		Mathematical Softwares	3+0	5,0	MAT 429	(Eng.)	Galois Theory	3+0	5,0
MAT 267		Mathematics with Models	2+0	3,0	MAT 430		Linear Differential Equations	3+0	5,0
MAT 267	(Eng.)	Mathematics with Models	2+0	3,0	MAT 430	(Eng.)	Linear Differential Equations	3+0	5,0
MAT 273		Construction of Number Systems	3+0	5,0	MAT 431		Introduction to Number Theory I	3+0	5,0
MAT 273	(Eng.)	Construction of Number Systems	3+0	5,0	MAT 431	(Eng.)	Introduction to Number Theory I	3+0	5,0
MAT 309		Advanced Programming	2+2	5,0	MAT 432		Introduction to Number Theory II	3+0	5,0
MAT 310		Selected Topics on Computer	2+2	5,0	MAT 432	(Eng.)	Introduction to Number Theory II	3+0	5,0
MAT 311		Numerical Analysis I	3+0	5,0	MAT 433		Fractal Geometry I	3+0	5,0

MAT 312		Numerical Analysis II	3+0	5,0	MAT 433	(Eng.)	Fractal Geometry I	3+0	5,0
MAT 313		Differential Geometry I	3+0	5,0	MAT 434		Fractal Geometry II	3+0	5,0
MAT 314		Differential Geometry II	3+0	5,0	MAT 434	(Eng.)	Fractal Geometry II	3+0	5,0
MAT 318		Matrix Analysis	3+0	5,0	MAT 435		Discrete Dynamical Systems	3+0	5,0
MAT 318	(Eng.)	Matrix Analysis	3+0	5,0	MAT 436		Introduction to Perturbation Methods	3+0	5,0
MAT 319		Euclidean and Non-Euclidean Geometries	3+0	5,0	MAT 436	(Eng.)	Introduction to Perturbation Methods	3+0	5,0
MAT 367		History of Mathematics I	3+0	5,0	MAT 439		History of Mathematics Concepts	3+0	5,0
MAT 368		History of Mathematics II	3+0	5,0	MAT 452		Applications of Partial Differential Equations	3+0	5,0
MAT 406		Geometric Topology	3+0	5,0	MAT 452	(Eng.)	Applications of Partial Differential Equations	3+0	5,0
MAT 406	(Eng.)	Geometric Topology	3+0	5,0	MAT 453		Linear Programming	3+0	5,0
MAT 407		Uniform Spaces	3+0	5,0	MAT 453	(Eng.)	Linear Programming	3+0	5,0
MAT 407	(Eng.)	Uniform Spaces	3+0	5,0	MATSJ 301		Internship	0+2	5,0

Elective Courses

BEÖ 155		Physical Education	2+0	2,0	İKT 108		Introduction to Economics II	4+0	6,0
BRİ 101		Bridge	2+0	3,0	İKT 213		Mathematical Economics	3+0	4,5
ESTÜ 101		Introduction to University Life	0+1	2,0	İKT 309		Monetary Theory	3+0	5,0
ESTÜ 104		Akademik Başarı ve Yaşam Becerileri	2+1	3,0	İKT 310		Monetary Policy	3+0	5,0
ESTÜ 106		Proje Yönetimi	2+1	3,0	İKT 322		International Economics	2+0	5,0
ESTÜ 111		Volunteering Works	1+2	4,0	İKT 324		Financial Institutions and Banking	2+0	3,0
ESTÜ 112		Cyber Security for Everyone	2+0	2,0	İKT 417		Financial Economics I	2+0	3,0

ESTÜ 113	Design Thinking	3+0	2,0	İKT 418		Financial Economics II	2+0	3,0
ESTÜ 114	Visual Thinking	3+0	3,0	İKT 421		Economy of Turkey	2+0	3,0
ESTÜ 115	Photographic Viewpoint	2+1	3,0	İNG 225	(Eng.)	Academic English I	3+0	3,0
ESTÜ 116	Computer Aided Design I	3+0	3,0	İNG 226	(Eng.)	Academic English II	3+0	3,0
ESTÜ 117	Computer Aided Design II	3+0	3,0	İNG 325	(Eng.)	Academic English III	3+0	3,0
ESTÜ 118	Visual Thinking with Concepts	3+0	3,0	İNG 326	(Eng.)	Academic English IV	3+0	3,0
ESTÜ 119	Flute	3+1	3,0	İNG 425	(Eng.)	Academic English V	3+0	3,0
ESTÜ 120	Solfege	3+1	3,0	İNG 426	(Eng.)	Academic English VI	3+0	3,0
ESTÜ 121	Piano	3+1	3,0	İŞL 215	(Eng.)	Time Management	1+1	3,0
ESTÜ 122	Guitar	3+1	3,0	İŞL 215		Time Management	1+1	3,0
ESTÜ 123	Gender Equality in Work Life	2+0	3,0	İŞL 301		Human Resources Management	3+0	4,0
ESTÜ 125	Philosophy of Science	3+0	3,0	MAT 365		Creativity and Innovation Management	2+0	2,0
ESTÜ 132	History of Political Thought	3+0	3,0	MÜZ 151		Short History of Music	2+0	3,0
ESTÜ 133	Disability and Awareness	3+0	3,0	MÜZ 155		Turkish Folk Music	2+0	2,0
ESTÜ 204	Effective Reading and Writing Skills	3+0	4,0	SAN 155		Hall Dances	0+2	2,0
ESTÜ 307	Children Rights and Family Education	2+0	2,0	SNT 155		History of Art	2+0	2,0
ESTÜ 401	Introduction to Professional Life	1+1	2,0	SOS 155		Folkdance	2+0	2,0
FİN 305	Financial Mathematics	2+0	3,0	THU 203		Community Services	0+2	3,0
İKT 107	Introduction to Economics I	4+0	6,0	TÜR 120		Turkish Sign Language	3+0	3,0

Foreign Language Courses

ALM 175	(Ger)	German I	3+0	3,0	FRA 176	(Fra.)	French II	3+0	3,0
ALM 176	(Ger)	German II	3+0	3,0	İNG 187	(Eng.)	English I	3+0	3,0

COURSE CONTENTS

EMAT113 Calculus I 4+2 7,5

Basic Concepts: Real numbers, Coordinate system in the plane, Functions and Their Graphs: Operations on functions, Trigonometric functions; Limits and Continuity: Limits of functions, Limits at infinity and infinite limits, Continuity; Derivative: Concept of derivative, Differentiation rules; Mean value theorem, Implicit differentiation; Transcendental Functions: Inverse functions, Exponential and logarithmic functions, Inverse trigonometric, hyperbolic and inverse hyperbolic functions; Applications of Derivative: Extreme values, Concavity and inflections, Sketching the graph of a function, Extreme-value problems, Taylor polynomials, Indeterminate forms.

EMAT114 Calculus II 4+2 7,5

Integral: Sums and sigma notation, Definite integral, Properties of the definite integral, The fundamental theorem of calculus; Indefinite integral and Integration Techniques: Indefinite integral, Change of variables, Integration by parts, Improper integrals; Applications of Integrations: Areas of plane regions, Volumes of solids of revolution, Arc-length, Surface area, Mass, Moments and center of mass; Complex Numbers: Representation of complex numbers in the plane, Complex arithmetic, Roots of complex numbers; Sequences and Series: Sequences and convergence, Infinite series, Power series, Taylor and Maclaurin series, Binomial theorem and Binomial series.

FIZ361 Project Writing and Academic Presentation Techniques 2+0 3,0

Project Concept and Features, Introduction to Project Management, Integration Management in Projects, Scope Management in Projects, Time Management in Projects, Cost Management in Projects, Quality Management in Projects, Risk Management in Projects, Human Resources Management in Projects, Communication Management in Projects, Procurement and Contract Management in Projects, Projects Outputs Reporting, Presentation Techniques of Prepared Projects, Project Application to National and International Support Programs.

FIZ363 Healty Nutrition 2+0 3,0

Healthy Nutrition: Fundamentals of adequate and balanced nutrition, Science of nutrition; Nutrients: Nutrients, Functions of nutrients; Carbohydrates: Types, Digestion; Proteins: Types, Digestion, Synthesis; Lipids: Types, Digestion; Vitamins: Fat and water soluble vitamins, Functions, Minerals and Water: Major, Minor and toxic minerals, Importance of water; Basic Food Groups: Five basic food groups, New nutrition pyramid; Energy and Energy Calculations: Energy, Total energy need; Meal and menu planning: Meal, Sample menu, Healthy recipes, Special nutrition groups: Healthy eating in young people, Nutritional disorders; Nutritional models: Balanced diet, Gluten-free diet, Vegetarian diet, Vegan diet.

FIZ365 Energy Resources Technology 2+0 3,0

Energy: Basic concepts, Types of energy, Classification of energy resources; Electrical Energy: Properties of electrical energy, Methods of generating electrical energy, Generators and their types; Electricity Generation: Thermal and geothermal power plants, Hydroelectric power plants, Nuclear power plants, Wind turbines, Solar panels, Concentrated solar power generation systems, Hybrid electric

power generation systems; Energy Storage: Energy storage methods, energy storage systems and equipment; Energy Economics: Basic concepts, Heat energy recovery systems and equipment.

FİZ445 Statistical Mechanics

2+0 3,0

Basic Concepts of Thermodynamics: Thermodynamical laws, Heat engines; Statistical Description of Physical Systems; Maxwell-Boltzman Distribution; Microstates and Macrostates; Entropy; Thermodynamic Potentials; Classical Statistical Theory; Microcanonical; Canonical and Grand Canonical ensembles; Partition Function; Quantum Statistics: Ideal Bose gas, Ideal Fermi gas; Phase Transitions; Ising Model; Langevin Equation.

FİZ447 Battery Technologies I

2+0 3,0

Energy Storage Overview; Energy Storage Requirement; Energy Storage Techniques; Fundamentals of the Battery: Battery components, Battery types, Cell operations in the battery, Theoretical cell voltage, Capacity, Energy density, Specific energy; Factors Affecting Battery Performance: Voltage level, Current and discharge rate, Discharge types, Effect of temperature, Service life; Electrochemical Principles and Reactions: Thermodynamic properties, Electrode reactions; Electroanalytical Methods: Cyclic voltammetry, Chronopotentiometry, Electrochemical impedance spectroscopy method; Rechargeable Battery Types: Lead-acid, Nickel-cadmium, Nickel metal hydride, Lithium-ion, Solid electrolyte, Metal-air, Lithium-sulfur.

FİZ461 Introduction to Turbulence

3+0 3,0

Basic Hydrodynamic Equations: Navier-Stokes equations; Fourier Space Transformation: Flow equations, Kinetic energy, Vorticity, Kinetic helicity, Enstrophy; Craya-Herring Basis: Triads; Instability And Patterns; Energy Transfer: Mod-to-mod transfer, Shell-to-shell transfer, Richardson energy cascade; Kolmogorov's Theory: Inertial-dissipation range, Energy spectrum and flux, Four-fifth (4/5) law, Correlations.

FİZ470 Battery Technologies II

2+0 3,0

General Characteristics of Lithium-Ion Batteries; Structure of Lithium-Ion Battery; Anode Active Materials Used in Lithium-Ion Battery; Cathode Active Materials Used in Lithium-Ion Battery; Solvents and Salts Used in Lithium-Ion Battery Electrolyte: Other Components Used in Lithium Batteries: Separator, Connectors, Current collectors, Cell container; Charge-Discharge Methods of Lithium-Ion Batteries; Electrochemical Cell Models of Lithium-Ion Batteries: Electrochemical models, Combined cell model; Applications of Lithium-Ion Batteries; Safety in Lithium-Ion Batteries; Issues Needing Improvement in Lithium-Ion Batteries.

"The contents of the newly opened courses in the 2023-2024 Academic Year are available above. You can access other course contents from the 2022-2023 Academic Year course contents section."